

REFERENCE

NBS
PUBLICATIONS

NBSIR 82-2567

NAT'L INST. OF STAND & TECH



A11106 261272

Analysis of Sections 4.2 Through 4.14 of the GSA Proposed Uniform Federal Accessibility Standard

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards
National Engineering Laboratory
Center for Building Technology
Structures Division
Washington, DC 20234

August 1982

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by:

Management Division

Services Administration

on, DC 20405

NBSIR 82-2567

**AN ANALYSIS OF SECTIONS 4.2
THROUGH 4.14 OF THE GSA
PROPOSED UNIFORM FEDERAL
ACCESSIBILITY STANDARD**

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August 1982

Sponsored by:
Design Management Division
General Services Administration
Washington, DC 20405



U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, *Secretary*
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, *Director*

ABSTRACT

Recently, the General Services Administration (GSA) developed a draft uniform accessibility standard (the focus of this report) intended to be promulgated in conjunction with the Department of Housing and Urban Development, the Department of Defense, and the United States Postal Service. Under contract to the General Services Administration, the National Bureau of Standards (NBS), Center for Building Technology assisted in the review of part 4, "Accessible Elements and Spaces," sections 4.2 through and including 4.14 of the draft standard in order to determine the extent to which previously identified problems of accessibility (NBS database) were addressed by the provisions of the standard. The analysis was carried out by reviewing and classifying the provisions of the draft standard; searching the NBS data base for information relevant to the classes of provisions in the draft standard; and comparing the provisions with the NBS database.

ACKNOWLEDGMENTS

The author would like to express gratitude to Mrs. Kathleen Field, the Project Liaison Representative and Ms. Diane Walters, Chief, Design Program Branch of the General Services Administration for their assistance, insights, and patience during the conduct of the project. The author gratefully acknowledges the critical reviews of drafts by Dr. Belinda Collins and Dr. Arthur Rubin of the NBS Center for Building Technology (CBT) and the final review by Mr. Harold Nelson of the Center for Fire Research. Finally, the author thanks the staff of the CBT Word Processing Center.

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1. INTRODUCTION

1.1 BACKGROUND

The purpose of building accessibility standards is to make buildings accessible to people having various physical disabilities. In recent years, attention to disabled building users and corresponding Federal legislation has fostered the development of a revised national standard (ANSI A117.1-1980) and numerous accessibility design guidelines.

Recently, the General Services Administration (GSA) developed a draft uniform accessibility standard (the focus of this report) intended to be promulgated in conjunction with the Department of Housing and Urban Development, the Department of Defense, and the United States Postal Service. The purpose of the proposed standard is to establish a measure for determining facility accessibility by the physically disabled in federal and federally-funded facilities.

1.2 OBJECTIVE AND SCOPE OF THE ANALYSIS

Under contract to the General Services Administration, the National Bureau of Standards (NBS), Center for Building Technology assisted in the review of Part 4, "Accessible Elements and Spaces," sections 4.2 through and including 4.14 of the draft standard in order to determine the extent to which previously identified problems of accessibility [Accessibility: An Approach...., 1977] were addressed by the provisions of the standard.

The analysis was carried out by reviewing and classifying the provisions of the draft standard; searching the NBS database (files of previously identified problems of accessibility) for information relevant to the classes of provisions in the draft standard; and comparing the provisions with the NBS database.

1.3 ORGANIZATION OF THE REPORT

This report is organized in five sections:

Section 1, the current section, provides a general introduction.

Section 2 presents a description of the structure of the NBS database. In addition, it describes Part 4 of the GSA draft standard and the method by which its provisions were classified.

Section 3 presents the results of the search of the NBS database for information relevant to the provisions in the draft standard.

Section 4 summarizes the comparison of the GSA provisions with relevant sets of data from the NBS database.

Section 5 lists the references cited in the text.

2. DESCRIPTION OF THE NBS DATABASE AND THE GSA STANDARD

2.1 INTRODUCTION

This section describes the format of the data as well as the relationships among data items that make up the NBS database. In addition the GSA draft standard's technical provisions concerning accessible elements and spaces are described.

Section 2.2 identifies the source of the accessibility data, and explains the structure of the records (units of data) that make up the database.

Section 2.3 presents the technical provisions from the draft standard that were the focus of this analysis. Also, a description of the coding of the technical provisions into a format similar to the NBS data records is provided.

2.2 NBS DATABASE

During 1981, the Occupancy Safety Group of the Center for Building Technology developed a database of information about problems that disabled people experience when they use buildings. The information consisted of reported deficiencies of buildings and was collected by the Building Research Advisory Board (BRAB) from a survey of a variety of disabled individuals and organizations and individuals working with the disabled [Accessibility: An Approach ..., 1977].* The reported deficiencies were characteristics or qualities of building components or a component's environment that cause accessibility problems for disabled individuals.

The BRAB "Panel on Building Design Criteria for the Disabled" was responsible for analyzing and reporting the results of the data collection. The BRAB report does not indicate how the respondents were selected nor the rate of response to 500 mailed survey forms. Therefore, the building deficiencies reported may not be complete and/or unbiased. However, because the deficiencies illustrate some of the practical situations encountered by disabled building users, they provide an initial basis for identifying and defining accessibility problems.

Approximately 459 deficiencies in building accessibility are included in the BRAB report and are presented in a format that classifies them with respect to the building components of concern and the types of disabilities directly affected. The deficiencies cited form the basis for the records that constitute the NBS database. However, since a single deficiency can affect many different classes of disabled users, more than one record can be developed for each deficiency.

* BRAB is now the Advisory Board on the Built Environment (ABBE) of the National Research Council. However, reference will be made to the BRAB report throughout this paper.

Figure 1. Accessibility database record

Characteristics of Building Components	Building Circulation Components	Building Uses	User Disabilities	Incidents of Inaccessibility
--	---------------------------------	---------------	-------------------	------------------------------

Appendix A lists the categories and numerical codes for each of the record fields. Although the deficiencies reported by BRAB covered many types of building components and building uses, the NBS database has only been completed for circulation components and uses. The current database contains approximately 500 records. Appendix B provides a description and general summary of the NBS database.

The logical structure for the database records is based on the assumption that problems (incidents of building inaccessibility) occur when physical characteristics of building systems require abilities that are not possessed by some segment of the user population (i.e., the disabled).

The format of the records follows a causal sequence from physical characteristics of buildings to their effect on building users. Each record contains five fields as illustrated in Figure 1. The fields are arranged from left to right analogous to a causal sequence initiated by characteristics of the environment transmitted through building components, their uses, user's abilities, and resulting in incidents of inaccessibility.

2.3 GSA DRAFT STANDARD

The purpose of the GSA draft standard is to establish a measure for facility accessibility by the physically disabled. The standard is applicable to the design, construction, and alteration of federal and federally-funded buildings and facilities.

The technical provisions of the standard are aimed at establishing a minimum of at least one accessible route through a building and its site. The provisions are the same as those of the American National Standard Institute's document A117.1-1980 with certain exceptions.

The technical provisions that were the focus of the analysis are contained in sections 4.2 through 4.14. The provisions specified requirements for space allowances and reach ranges; accessible routes; protruding objects; ground and floor surfaces; parking and passenger loading zones; curb ramps; ramps; stairs; elevators; platform lifts; doors; and entrances.

Figure 2. GSA data file record

Characteristic of Building Components	Building Component	Provision Number
---------------------------------------	--------------------	------------------

A data file (GSA data file) for the provisions in sections 4.2 through 4.14 was developed by entering provisions as records. The format and coding for the records was similar to the NBS database. However the GSA data file records contain only three fields as illustrated in figure 2.

In certain cases, the technical provisions specified characteristics in a global or general way without mentioning a specific component. Therefore, some of the records in the GSA data file contain blank fields. Appendix C is a listing of the GSA data file.

3. QUERIES OF THE NBS DATABASE AND THE GSA STANDARD

3.1 INTRODUCTION

This section describes the queries of the NBS database and the GSA standard (data file). Section 3.2 presents general information about relative rates of occurrences of the different fields in records of the database and data file. Section 3.3 presents specific information from the database about the characteristics of components that have been identified as causing accessibility problems and information from the data file relative to those same components.

3.2 RATES OF OCCURRENCE OF CHARACTERISTICS AND COMPONENTS IN THE DATABASE AND DATA FILE

The objective of this analysis was to determine the extent to which previously identified problems of accessibility were addressed by the provisions of the GSA draft standard. In order to meet the objective, several comparisons were made between the NBS database and the draft standard as represented by the GSA data file.

Figure 3 contains histograms showing the rates of occurrences of the component characteristic types in the NBS database, and the rates of occurrences of the component characteristic types in the GSA data file. The frequencies indicated by the histograms represent rates at which characteristics of circulation components were reported in conjunction with accessibility problems and were cited in the GSA Standard's provisions.

It is apparent in figure 3 that the majority of the characteristics found in both the database and the file fall in the first three categories: dimension, configuration, and surface condition. However, the relative frequencies among those categories in the database is different from the relative frequencies among the same categories in the data file. Surface conditions are the most frequently cited characteristics leading to accessibility problems in the database, while dimensions are the most frequently specified characteristic in the data file.

Figure 4 contains histograms showing the frequencies of the circulation component types in the database and the frequencies of the circulation component types in the file.

About half of the component types found in the database and file are in the fourth category, vertical building circulation components. As with the component characteristics, the database and file differ in the relative frequencies among the component types. However, the database and data file overwhelmingly show vertical circulation components as most frequently occurring in both of them.

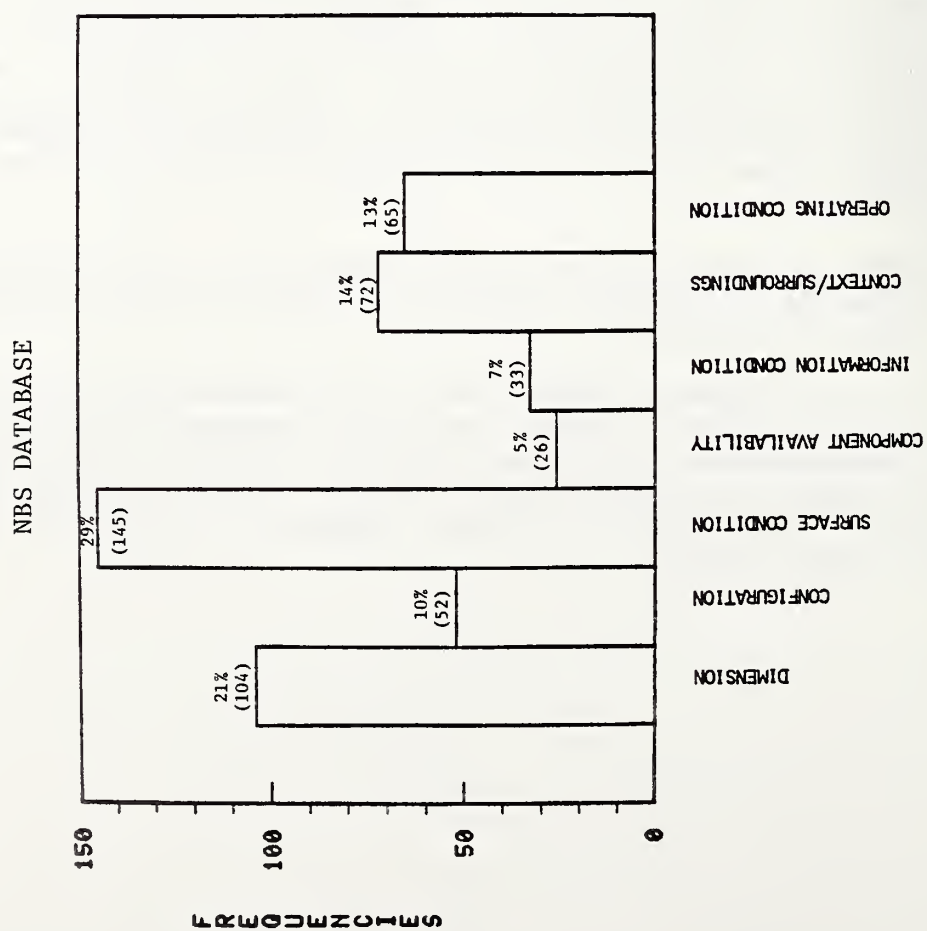
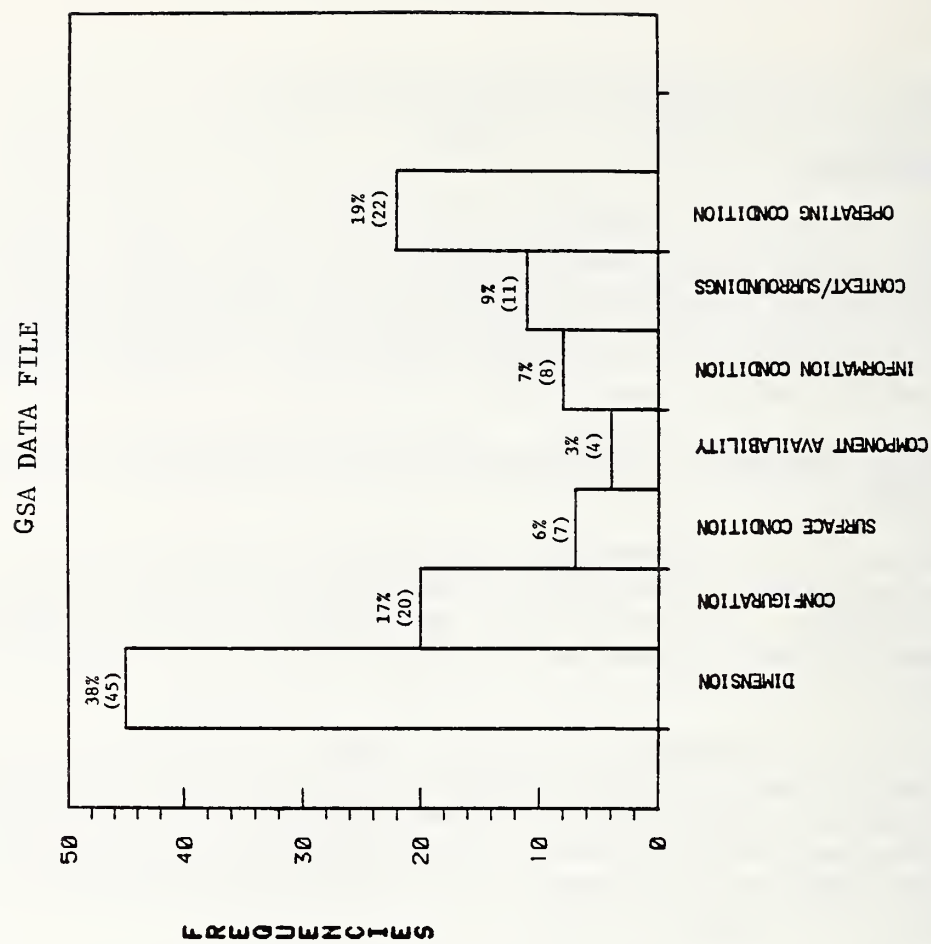
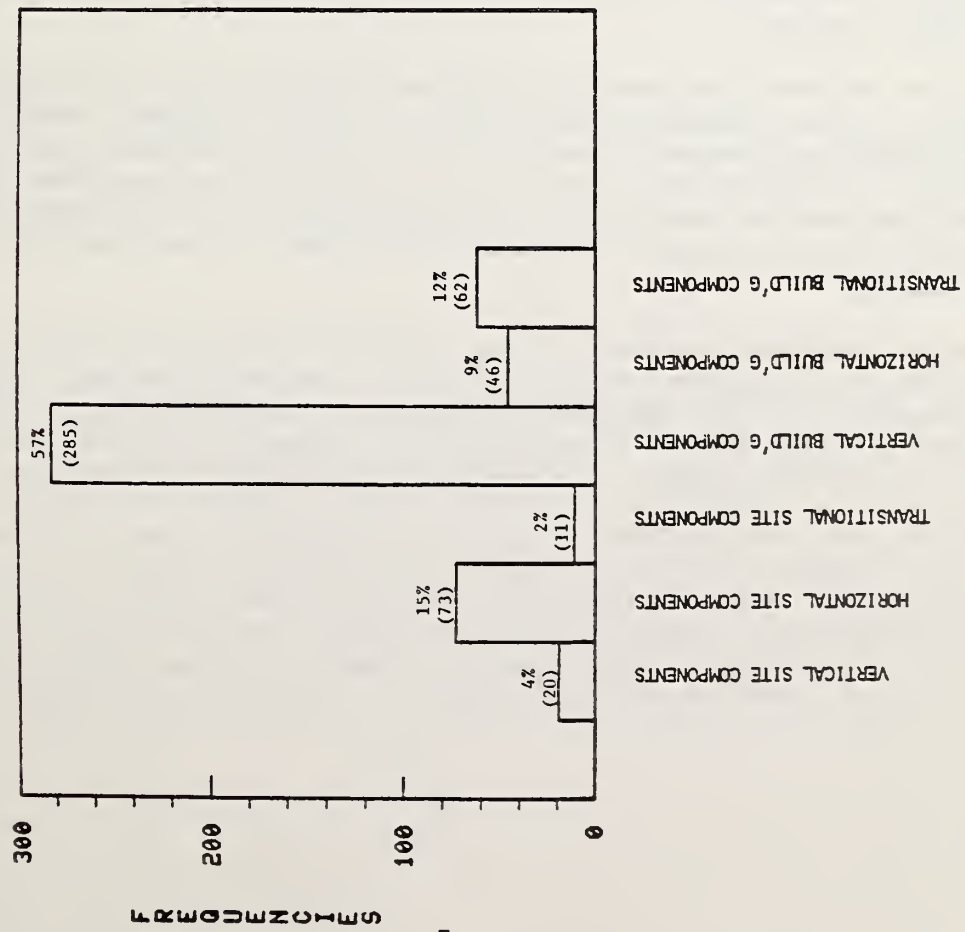


Figure 3. Rates of occurrences of characteristics of circulation components in the NBS database

NBS DATABASE



GSA DATA FILE

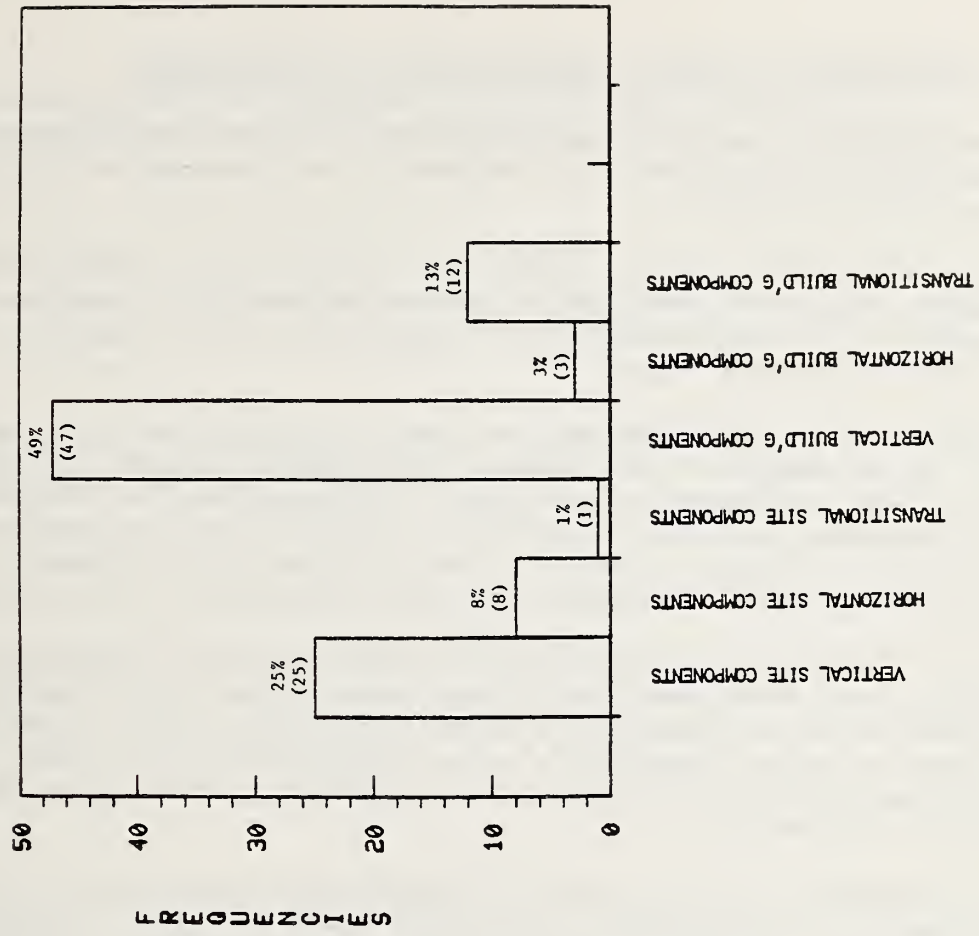


Figure 4. Rates of occurrences of characteristics of circulation components in the GSA data file

3.3 RELATIONSHIPS BETWEEN CHARACTERISTICS AND COMPONENTS

Another comparison made between the NBS database and the GSA data file, characteristics associated with components, is presented in figures 5 and 6 and in tables 1 and 2.

Figure 5 illustrates the occurrences of characteristics associated with components that were identified as causing accessibility problems. Where an "X" occurs at the intersection of a characteristic and component, a deficiency was cited in the BRAB report.

The grid lines are included only as aids to relating the X's to approximate values on the numerical code frames. The graph in figure 5 is provided to give a visual indication of how either a characteristic or component can be quickly compared to others in terms of its particular frequency of citation in accessibility problems. Table 1 gives a listing of the categories of characteristic/component relationships and their frequencies of occurrence.

Figure 6 illustrates the occurrences of characteristics associated with components that were specified in provisions of the draft standard. Where an "O" occurs at an intersection, a minimum requirement for a characteristic of a component was cited. Where "O's" occur along the vertical frame line, the provisions specified characteristics in a global or general way without mentioning a specific component.

As with figure 5, the grid lines in figure 6 are merely aids to relating to the values on the frame lines. While the graph in figure 6 provides a visual indication of the relationships specified in the data file, table 2 gives a listing of the categories of relationships and the relevant provisions from the draft standard.

Since the database had more characteristic/component relationships than the data file, there were more deficiencies cited in the BRAB report than there were minimum requirements specified in the draft standard. Nevertheless, it may not be necessary for a provision to be written in response to every deficiency that can be identified. A single provision can eliminate more than one deficiency or it may only be feasible to correct a deficiency through some other means.

One way to determine whether or not provisions should be written for a deficiency is to assign relative values to the deficiencies. Field five of each record of the NBS database indicates the severity of the consequences to disabled building users of characteristic/component deficiencies. The incident

of inaccessibility code* (see Appendix A) indicates the severity of a deficiency and provides a means for establishing priority for provisions.

* It is important to point out that the incident of inaccessibility was coded in a purely subjective manner. Since the type of incident was not a part of the BRAB report format, the person entering the deficiencies into records made the decision based on professional judgement as to the extent to which a given deficiency would cause an incident of inaccessibility. In order to maintain some degree of consistency, the same individual was responsible for entering all of the records. However, to reiterate, the coding in the fifth field of a record only represents the opinion of the NBS coder and not the BRAB data.

CHARACTERISTICS

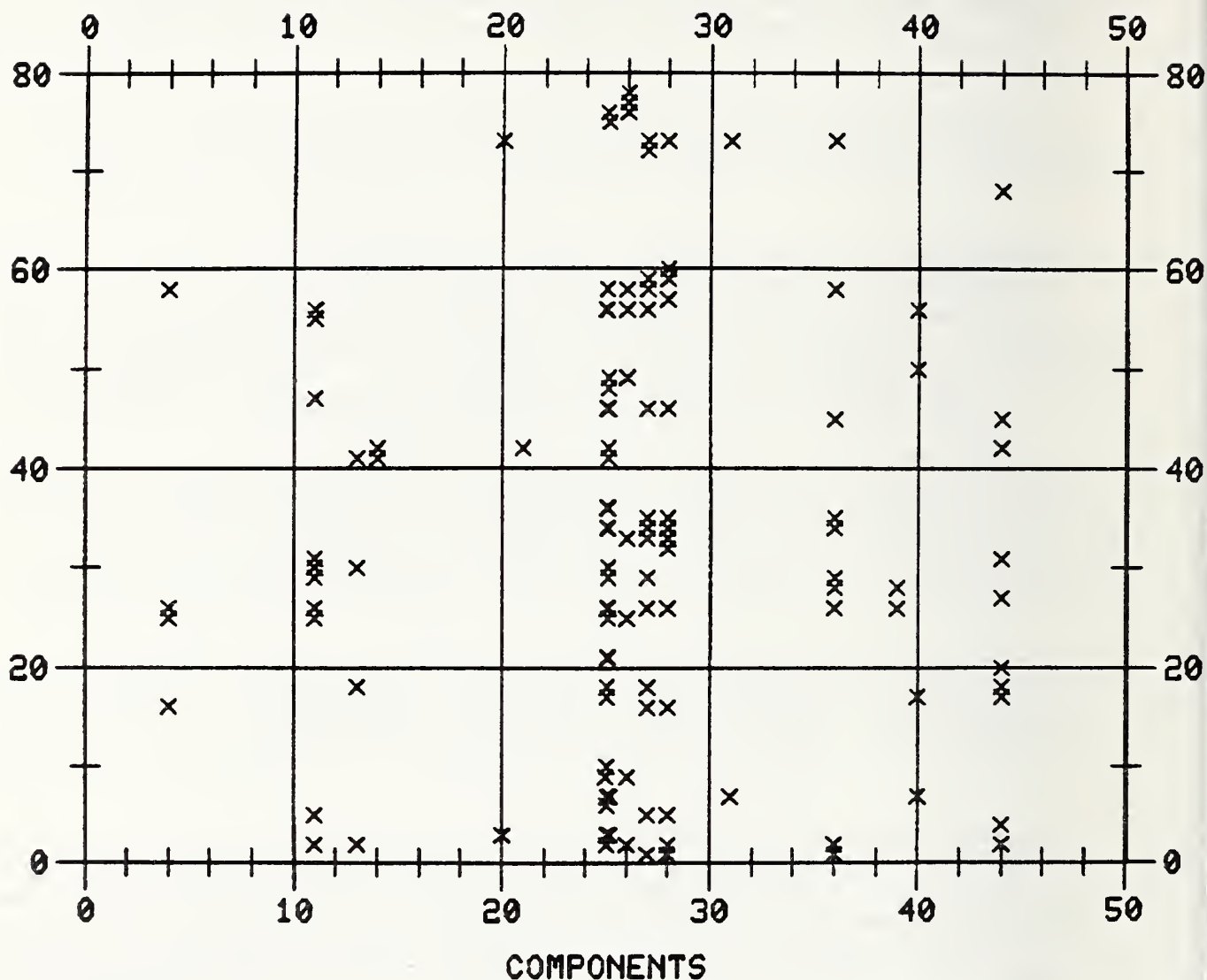


Figure 5. Characteristics of circulation components causing accessibility problems

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Table 1. Characteristics of Circulation Components Causing Accessibility Problems

Characteristics	Component	Number of Occurrences in the Database
Shape	Curb cuts	5
Uneven surface	" "	4
Slippery surface	" "	5
Objects that protrude or obstruct	" "	6
Width	Site Walkways	3
Slope	" "	5
Uneven surface	" "	4
Slippery surface	" "	4
Glare producing surface	" "	1
Holes or depressions	" "	5
Protrusions from surface	" "	4
Lack of information	" "	1
Inappropriate foliage or landscaping	" "	13
Poor or no illumination	" "	14
Width	Parking spaces	2
Location	" "	3
Holes or depressions	" "	5
Insufficient number	" "	6
Not available	" "	3

Table 1. Characteristics of Circulation Components Causing Accessibility Problems (Continued)

Characteristics	Component	Number of Occurrences in the Database
Height	Curbs	4
Insufficient manual assistance	"	4
None	Site railings	3
Rate of movement	Elevators	2
Poor or no illumination	"	1
Location	Elevator waiting area	2
Slippery surface	" " "	4
Loose surface	" " "	4
Carpeting pile height	" " "	4
Poor or no illumination	" " "	1
Objects that protude or obstruct	" " "	5
Height	Elevator call buttons	5
Area dimension	" " "	3
Resistance to operation	" " "	3
Relative position	" " "	3
Non-uniform placement	" " "	2
Imperceptible	" " "	3

Table 1. Characteristics of Circulation Components Causing Accessibility Problems (Continued)

Characteristics	Component	Number of Occurrences in the Database
Height	Elevator car location indicator	1
Non-uniform placement	" " "	2
Imperceptible	" " "	3
"	Elevator directional indicator	3
Width	Elevator doors	2
Operating time	" "	2
Operation non-reversible	" "	3
Height	Elevator car operating panel	5
Area dimension	" " "	3
Resistance to operation	" " "	3
Relative position	" " "	3
Non-uniform placement	" " "	2
Imperceptible	" " "	2
Height	Elevator emergency phone	5
Non-uniform placement	" " "	2
Imperceptible	" " "	2
Confusing information	" " "	1
Complex manipulation required	" " "	2
Height	Elevator in-car location indicator	1
Imperceptible	" " "	2

Characteristics	Component	
Inappropriately located	Elevator in-car location indicator	1
Area dimension	Elevator car platform (floor)	1
Slippery surface	" " "	4
Glare producing surface	" " "	1
Loose surface	" " "	4
Carpeting pile height	" " "	4
Glare producing surface	Elevator car walls	1
Insufficient number	Elevator car handrails	4
None	" " "	4
Uneven alignment	Elevator floor and waiting area sills	5
Hole (space between)	" " " "	5
Height	Elevator door opening detectors	3
Area dimension	Elevator emergency exitway	2
Inappropriately located	Escalators	3
Uneven surface	Escalator up comb-plate	4
Poor or no illumination	" " "	1
Objects that protrude or obstruct	" " "	1

Table 1. Characteristics of Circulation Components Causing Accessibility Problems (Continued)

Characteristics	Component	Number of Occurrences in the Database
Width	Escalator steps	3
Rate of movement	" "	3
No edge marking	" "	1
Operation non-reversible	" "	5
Intermeshes with or closes against something smooth	" "	2
No emergency stop	" "	5
Uneven surface	Escalator down comb-plate	4
Poor or no illumination	" "	1
Objects that protrude or obstruct	" "	1
Intermeshes with or closes against something	Escalator handrail	4
Run length	Stairs	4
Slope	"	5
Shape	"	2
Location	"	3
Slippery surface	"	16
Glare producing surface	"	1
No edge marking	"	1
Loose surface	"	5
Grating surface	"	1
Imperceptible	"	3

Table 1. Characteristics of Circulation Components Causing Accessibility Problems (Continued)

Characteristics	Component	Number of Occurrences in the Database
Poor or no illumination	Stairs	1
Objects that protrude or obstruct	"	1
Exposure to weather	"	7
Missing part	"	1
Insufficient handrails	"	5
Run length	Ramps	3
Width	"	1
Slope	"	5
Shape	"	1
Slippery surface	"	4
Abrupt level change in surface	"	5
No edge marking	"	5
Loose surface	"	5
Grating surface	"	1
Imperceptible	"	2
Indirect or undesired route	"	4
Exposure to weather	"	5
Low ceiling	"	2
Insufficient handrails	"	9
Area dimension	Ramp landings	3
Insufficient handrails	" "	6

Table 1. Characteristics of Circulation Components Causing Accessibility Problems (Continued)

Characteristics	Component	Number of Occurrences in the Database
Length	Corridors	3
Width	"	2
Slippery surface	"	2
Surface texture change	"	1
Glare producing surface	"	2
Loose surface	"	4
Grating surface	"	1
Insufficient information	"	1
Objects that protrude or obstruct	"	4
Insufficient manual assistance	"	4
Slippery surface	Lobbies	4
Surface texture change	"	3
Area dimension	Entry-way/entrance area	2
Relative position	" "	5
Handicap access ID missing	" "	4
Width	Doors	6
Weight	"	9
Relative position	"	6
Location	"	7
Direction of swing	"	3

Table 1. Characteristics of Circulation Components Causing Accessibility Problems (Continued)

Characteristics	Component	Number of Occurrences in the Database
Rough surface	Doors	3
Surface protrusions	"	5
None for handicapped	"	6
Insufficient information	"	2
No automatic opener	"	15

Table 2. Characteristics of Circulation Components Prescribed in the GSA
Draft Standard

Characteristics	Components	Relevant Provisions
Length	-	4.2.2.1
Width	-	4.2.1 4.2.2 4.2.4.1 4.3.3 4.3.4
Height	-	4.2.5 4.2.6
Slope	-	4.3.7
Area dimension	-	4.2.3 4.2.4
Shape	-	4.2.4.2
Relative position	-	4.2.4.1
Location	-	4.3.4
Abrupt level change	-	4.3.8 4.5.2
Loose surface	-	4.5.3
Grating surface	-	4.5.4
Carpeting pile height	-	4.5.3

Table 2. Characteristics of Circulation Components Prescribed in the GSA
Draft Standard (Continued)

Characteristics	Components	Relevant Provisions
Objects that protrude or obstruct	-	4.4.1
Low ceiling	-	4.4.2
Exposure to weather	Site stairs	4.9.6 4.7.3
Width	Curb cuts	4.7.10
Slope	" "	4.7.2 4.7.5
Shape	" "	4.7.10
Relative position	Curb cuts	4.7.6 4.7.9 4.7.10
Location	" "	4.7.1
Objects that protrude or obstruct	" "	4.7.8
Width	Ramps	4.8.3
Slope	"	4.8.1 4.8.2
No handrail	"	4.8.5 4.8.5(1)

Table 2. Characteristics of Circulation Components Prescribed in the GSA
Draft Standard (Continued)

Characteristics	Components	Relevant Provisions
Missing element	Ramps	4.8.7
Insufficient handrails	"	4.8.5 4.8.5(1) 4.8.5(2) 4.8.5(3) 4.8.5(4) 4.8.5(5) 4.8.5(6)
Width	Parking spaces	4.6.3
Location	" "	4.6.2
Insufficient number	" "	4.6.1
None	" "	4.6.1
Handicap access ID missing	" "	4.6.4
Length	Pedestrian drop-off and pick up points	4.6.5
Width	" "	4.6.5
Relative position	" "	4.6.5
Location	Turnstiles	4.13.2
Width	Elevator call buttons	4.10.12(1)

Table 2. Characteristics of Circulation Components Prescribed in the GSA
Draft Standard (Continued)

Characteristics	Components	Relevant Provisions
Height	Elevator call buttons	4.10.3 4.10.12(3)
Relative position	" " "	4.10.3 4.10.12(1) 4.10.12(4)
Insufficient information	" " "	4.10.3
Confusing information	" " "	4.10.12(2)
Height	Elevator directional indicator	4.10.4(1)
Relative position	" "	4.10.4(3)
Insufficient information	" "	4.10.4
Inappropriately located information	" "	4.10.4 4.10.4(3)
Operator time	Elevator doors	4.10.7 4.10.8
Operation non-reversible	" "	4.10.6
Poor or no illumination	Elevator car operating panel	4.10.11
Height	Elevator emergency phone	4.10.14

Table 2. Characteristics of Circulation Components Prescribed in the GSA Draft Standard (Continued)

Characteristics	Components	Relevant Provisions
Imperceptible	Elevator emergency phone	4.10.14
Relative position	Elevator in-car position indicator	4.10.13
Imperceptible Length	" " " Elevator car platform (floor)	4.10.13 4.10.9
Width	" " "	4.10.9
Poor or no illumination	" " "	4.10.11
Uneven	Elevator floor and waiting area sills	4.10.2
Poor or no illumination	" " "	4.10.11
Height	Elevator door opening detectors	4.10.6
Operating time	" " "	4.10.6
Exposure to weather	Stairs	4.9.6
Width	Ramps	4.8.3
Slope	"	4.8.1 4.8.2
Exposure to weather	"	4.8.8

Table 2. Characteristics of Circulation Components Prescribed in the GSA
Draft Standard (Continued)

Characteristics	Components	Relevant Provisions
Handrails missing	Ramps	4.8.5 4.8.5(1)
Missing part	"	4.8.7
Insufficient handrails	"	4.8.5 4.8.5(1) 4.8.5(2) 4.8.5(3) 4.8.5(4) 4.8.5(5) 4.8.5(6)
Length	Ramp landings	4.8.4(2) 4.8.4(3)
Width	" "	4.8.4(1) 4.8.4(3)
Area dimension	Entry-way/entrance area	4.13.6
Protrusions	" "	4.13.8
Indirect or undesired route	" "	4.14.2
Width	Doors	4.13.5
Operating time	" "	4.13.10 4.13.12

Table 2. Characteristics of Circulation Components Prescribed in the GSA
Draft Standard (Continued)

Characteristics	Components	Relevant Provisions
Resistance to operation	Doors	4.13.11(1) 4.13.11(2) 4.13.12
Relative position	"	4.13.7
Location	"	4.14.1
Insufficient number	"	4.14.1
None for handicapped	"	4.14.1
Complex manipulation required	"	4.13.9
Location	Turnstiles	4.13.2

4. SUMMARY OF THE COMPARISON OF THE NBS DATABASE TO THE GSA STANDARD

4.1 INTRODUCTION

This section summarizes the comparisons between relative rates of occurrences of characteristics and components in the database and data file. In addition, a summary comparison of the characteristic/component relationships between the database and file is presented.

4.2 SUMMARY OF RATES OF OCCURRENCE OF CHARACTERISTICS AND COMPONENTS

The relative rates of occurrences of component and characteristic types differed between the NBS database and the GSA data file. In particular, the frequency of occurrence of the surface condition characteristic relative to other characteristics in the database was completely different from the same relationships in the data file.

There is no obvious explanation for the difference between the database and file. It can be speculated that many of the problem causing aspects of surfaces result from wear and the quality of their maintenance over time, while the data file reflects provisions aimed at initial design configurations.

Unlike the characteristics, the rates of occurrence of the vertical circulation components was high in both the database and the data file. The only difference between the two was related to the location of the vertical components, building or site. The explanation of the difference between the locations is based on the way that the records were entered. The BRAB report contained many deficiencies associated with building elevators (a vertical building component). Likewise, the draft standard contained many provisions associated with elevators. However, the draft standard did not independently specify elevators inside the building as did the BRAB report. The provisions from the standard were entered as applicable to both site and building elevators. As a result, the GSA data file has a higher relative frequency of occurrence of vertical site components than does the NBS database.

4.3 SUMMARY OF CHARACTERISTIC/COMPONENT RELATIONSHIPS

The characteristic/component relationship was different between the database and data file. Figure 7 shows the relationships from both the database and data file. The intersections indicated by an "X" are from the database and those indicated by an "O" are from the data file. When data from both files occur at the same intersection, a black circle is used to show the location. In a few instances, it appears that an "X" and "O" coincide but are not blackened in. These situations are cases where the numerical codes were very close (such as, 25.04 and 25.05) and the graphic software treated the code numbers in such a way as to make them indistinguishable at the scale of figure 7. The grid lines are aids to relating to the values on the frame lines.

Of more than 140 relationships indicated in figure 7, only 24 were the same for both the database and the data file. When an "O" (provision) exists alone, it may be possible that similar provisions from existing standards have prevented a deficiency. When an "X" (deficiency) exists alone, it is necessary to

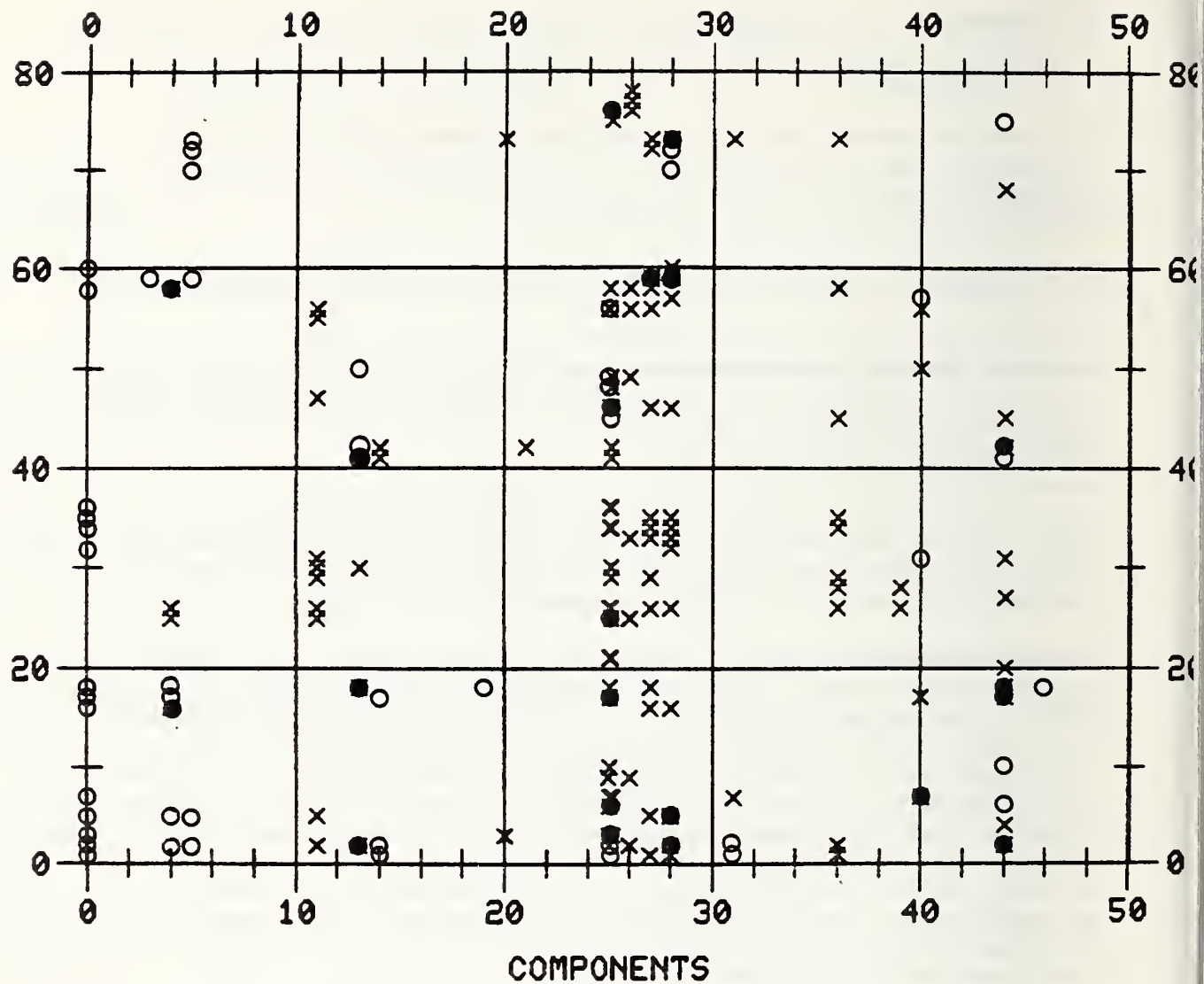


Figure 7. A comparison of characteristics of circulation components causing accessibility problems and those prescribed in the GSA draft standard

determine the severity of the deficiency and whether or not it can feasibly be eliminated or reduced.

Table 3 gives a listing of the categories of characteristic/component relationships common to both the database and data file.

Although not a part of this analysis, there are various ways of querying the database. For example, it is possible to examine any of the GSA provisions in terms of the extent to which they impact various disability types. Some provisions help all disabled user while others affect only one or two disability types. The information obtained from different types of database queries can be used to: 1) rank code and standard provisions in terms of their effectiveness over all disability types, 2) predict the kinds of accessibility problems that may be associated with proposed or existing building circulation components, or 3) help identify areas where research is needed.

In general, the information obtained from a database of accessibility problems can be used to: 1) analyze the scope and completeness of existing and proposed accessibility guidelines or regulations, 2) make decisions about what type of environmental alterations are optimum for the range of disability types, and 3) to predict the kinds of accessibility problems that may be associated with proposed or existing building designs. In addition, the database information can help identify areas where research is needed through the comparison of accessibility problem areas with the existing knowledge base.

Appendix D provides the overall structure and individual elements of accessibility problems for use in developing the general analyses mentioned above.

4.4. CONCLUSIONS

There was very little agreement between the NBS database and the GSA accessibility provisions. The accessibility problems represented in the database constitute an empirical analysis. The GSA standard may represent either an empirical or a logical approach to resolving accessibility problems. If the standard was developed from an empirical approach, the real-world problems in the database are different from those used to construct the standard. On the other hand, if the standard was developed from a logical approach, it may or may not have received confirmation relative to real-world problems.

Whatever may have been the method used for its development, the standard is necessary for establishing a measure for determining facility accessibility.

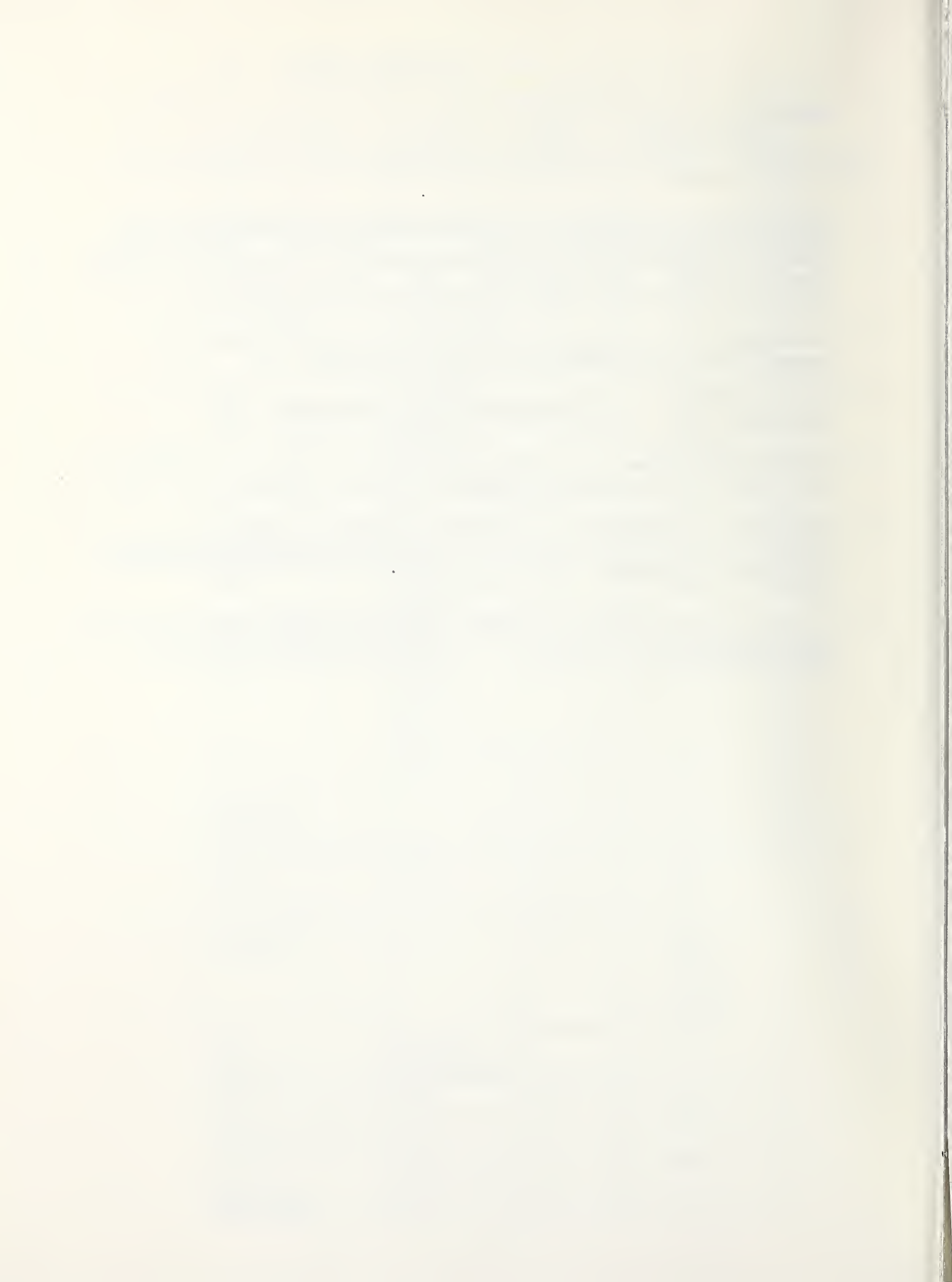
Table 3. Summary of Characteristic/Component Relationships Common in the Database and Data File

Characteristic	Component	Number of Records in Database	Relevant Provisions From Draft Standard
Shape	Curb cuts	5	4.7.5 4.7.10
Objects that protrude or obstruct	Curb cuts	6	4.7.8
Width	Parking spaces	2	4.6.3
Location	Parking spaces	3	4.6.2
Insufficient number	Parking spaces	3	4.6.1
Height	Elevator call buttons	5	4.10.3 4.10.12(3)
Relative position	Elevator call buttons	3	4.10.3 4.10.12(1) 4.10.12(4)
Operating time	Elevator doors	2	4.10.7 4.10.8
Operation non-reversible	Elevator doors	3	4.10.6
Height	Elevator emergency phone	5	4.10.14
Imperceptible	Elevator emergency phone	2	4.10.14
Imperceptible	Elevator in-car position indicator	2	4.10.13
Uneven	Elevator platform and waiting area sills	5	4.10.2
Height	Elevator door opening detectors	3	4.10.6
Exposure to weather	Stairs	7	4.9.6
Width	Ramps	1	4.8.3
Slope	Ramps	5	4.8.1 4.8.2
Insufficient handrails	Ramps	9	4.8.5 4.8.5(1) 4.8.5(2) 4.8.5(3) 4.8.5(4) 4.8.5(5) 4.8.5(6)
Area dimension	Entry-way/entrance area	2	4.13.6
Width	Doors	6	4.13.5
Relative position	Doors	6	4.13.7
Location	Doors	7	4.14.1
None for the handicapped	Doors	6	4.14.1

5. REFERENCES

These references include citations made in both the main body of the report and in the appendices.

- [1] Accessibility: An approach to the development of design criteria and applicable design solutions. Panel on Building Design Criteria for the Disabled, Committee on Accessible Environments for the Disabled, National Research Council. Washington, D.C., 1977. (Now organized as the Advisory Board on the Built Environment of the National Research Council.)
- [2] Cronberg, Tarja. Performance requirements for buildings. Swedish Council for Building Research, D3: 1975, Stockholm, 1975.
- [3] Foster, Bruce E., ed. Performance concept in buildings. Vol. I. Washington, D.C.: National Bureau of Standards, SP 361, 1972.
- [4] Markus, T. A., Whyman, P., Morgan J., Whitton, D., Maver, T., Canter, D., and Fleming, J. Building performance. New York: Halsted Press, 1972.
- [5] Steinfeld, E., Schroeder, S., Duncan, J., Faste, R., Chollet, D., Bishop, M., Wirth, P., and Cardell, P. Access to the built environment: a review of literature. Washington, D.C.: Government Printing Office, 1976.
- [6] Turner, George and Collins, Belinda. Pedestrian Movement Characteristics on Building Ramps. Washington, D.C.: National Bureau of Standards, NBSIR 81-2310, 1981.



APPENDIX A

PHYSICAL CHARACTERISTICS OF BUILDING COMPONENTS

These categories were developed primarily from the causal physical characteristics contributing to building component deficiencies outlined in the BRAB report.

Dimension - the measurable extent of the physical form and operations of building components.

1. LENGTH
2. WIDTH
3. HEIGHT
4. WEIGHT
5. SLOPE
6. OPERATING TIME
7. AREA
8. VOLUME
9. RATE OF MOVEMENT
10. RESISTANCE TO OPERATION

Configuration - the form or figure that results from a particular spatial arrangement of parts.

(Numbering is not continuous in sequence between categories in order to allow the addition of entries if necessary.)

16. SHAPE
17. RELATIVE POSITION
18. LOCATION
19. PATTERN
20. DIRECTION OF SWING
21. NON-UNIFORM PLACEMENT

Surface Condition - The manner or state of the surface of building components particularly circulation components such as floors, walkways, etc.

25. UNEVEN
26. SLIPPERY
27. ROUGH
28. TEXTURE CHANGE
29. GLARE PRODUCING
30. HOLES OR DEPRESSIONS
31. PROTRUSIONS
32. ABRUPT LEVEL CHANGE
33. NO EDGE MARKING
34. LOOSE SURFACE
35. GRATING
36. CARPETING PILE HEIGHT

Component Availability - extent to which a component can be used.

- 41. INSUFFICIENT NUMBER
- 42. NOT AVAILABLE (NONE)

Information Condition - the data, facts, or stimuli necessary for the appropriate use of a component

- 45. INSUFFICIENT
- 46. IMPERCEPTIBLE
- 47. NONE
- 48. CONFUSING
- 49. INAPPROPRIATELY LOCATED
- 50. HANDICAP ACCESS IDENTIFICATION MISSING

Context/Surroundings - the situation, background, or environment around a component

- 55. INAPPROPRIATE FOLIAGE & LANDSCAPING
- 56. POOR OR NO ILLUMINATION
- 57. INDIRECT OR UNDESIRABLE ROUTE
- 58. OBJECTS THAT PROTRUDE OR OBSTRUCT
- 59. EXPOSURE TO WEATHER
- 60. LOW CEILING

Operating Condition - the condition, help or aid necessary to use a building component

- 66. HUMAN ASSISTANCE INSUFFICIENT
- 67. HUMAN ASSISTANCE NOT AVAILABLE
- 68. MECHANICAL ASSISTANCE ELEMENT MISSING
- 69. MECHANICAL ASSISTANCE INSUFFICIENT
- 70. MANUAL ASSISTANCE ELEMENT MISSING
- 71. ELEMENT NOT OPERATING
- 72. ELEMENT HAS MISSING PART
- 73. MANUAL ASSISTANCE ELEMENT INSUFFICIENT
- 74. ELEMENT IS MISSING
- 75. COMPLEX MANIPULATION REQUIRED
- 76. OPERATION NON-REVERSIBLE
- 77. INTERMESHERS WITH OR CLOSES AGAINST SOMETHING
- 78. NO EMERGENCY STOP

BUILDING CIRCULATION COMPONENTS

These categories were developed by Turner and Collins [1981].

Vertical Site Components

1. ELEVATORS
2. ESCALATORS
3. STAIRS
4. CURB CUTS
5. RAMPS
6. VERTICAL PEOPLE MOVERS

Horizontal Site Components

10. HORIZONTAL PEOPLE MOVERS
11. WALKWAYS
12. PLAZAS
13. PARKING SPACES
14. PEDESTRIAN DROP-OFF AND PICK-UP POINTS

Transitional Site Components

18. GATES
19. TURNSTILES
20. CURBS
21. RAILINGS
22. FENCES

Vertical Building Components

25. ELEVATORS
 - 25.01 Waiting Area
 - 25.02 Call Buttons
 - 25.03 Car Location Indicator and Directory
 - 25.04 Directional Indicator
 - 25.05 Elevator Doors
 - 25.06 Car Operating Panel
 - 25.07 Emergency Phone
 - 25.08 In-Car Location Indicator
 - 25.09 Car Platform/Floor
 - 25.10 Car Walls
 - 25.11 Car Ceiling
 - 25.12 Handrails
 - 25.13 Platform/Waiting Area Sills
 - 25.14 Door Opening Detectors
 - 25.15 Emergency Exitway
26. ESCALATORS
 - 26.01 Up Comb Plate
 - 26.02 Steps
 - 26.03 Down Comb Plate
 - 26.04 Handrail

- 27. STAIRS
- 28. RAMPS
- 29. VERTICAL PEOPLE MOVERS
- 30. STAIR LANDINGS
- 31. RAMP LANDINGS

Horizontal Building Components

- 35. HORIZONTAL PEOPLE MOVERS
- 36. CORRIDORS
- 37. AISLES
- 38. WALKWAYS
- 39. LOBBIES
- 40. ENTRY-WAY/ENTRANCE AREA

Transitional Building Components

- 44. DOORS
- 45. GATES
- 46. TURNSTILES
- 47. RAILINGS

BUILDING USES

These categories of "uses" are human actions relative to the building system. Uses are general activities or operations that a person is engaged in or should be able to be engaged in within a building [Cronberg, 1975].

- 1. MOVEMENT BETWEEN BUILDING SITE LOCATIONS
- 2. MOVEMENT IN AND OUT OF BUILDINGS
- 3. MOVEMENT BETWEEN LOCATIONS WITHIN BUILDINGS
- 4. MOTIONS AND MANIPULATIONS ASSOCIATED WITH LOCATIONS IN BUILDINGS
- 5. MOTIONS AND MANIPULATIONS ASSOCIATED WITH BUILDING EQUIPMENT

USER DISABILITIES

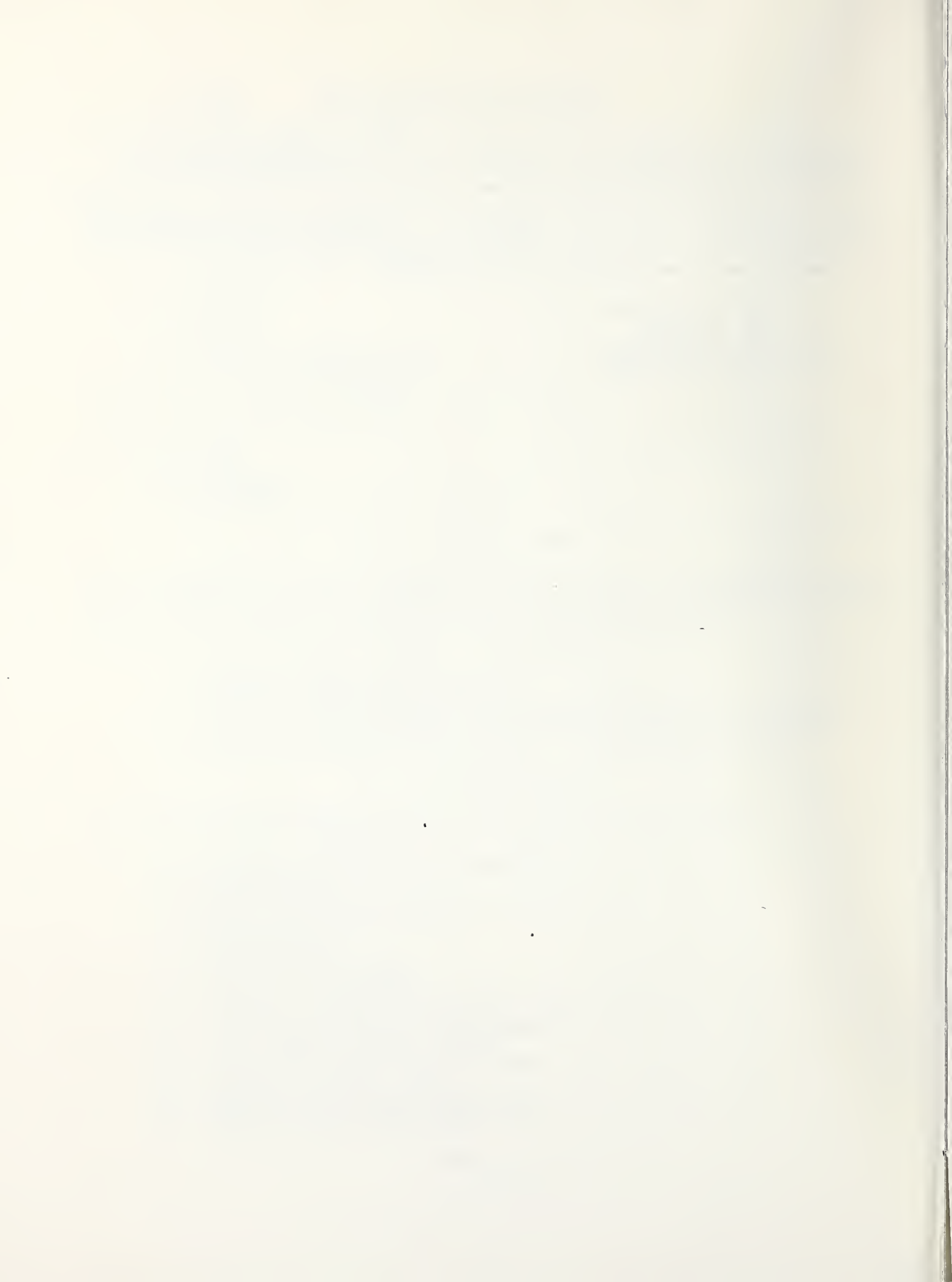
The categories were taken directly from Steinfeld, et al. [1979].

- 1. DIFFICULTY INTERPRETING INFORMATION
- 2. LOSS OF SIGHT
- 3. LOSS OF HEARING
- 4. PREVALANCE OF POOR BALANCE
- 5. UNCOORDINATION
- 6. LIMITAIONS OF STAMINA
- 7. DIFFICULTY MOVING HEAD
- 8. DIFFICULTY REACHING WITH ARMS
- 9. DIFFICULTY IN HANDLING AND FINGERING
- 10. LOSS OF UPPER EXTREMITY SKILLS
- 11. DIFFICULTY BENDING, KNEELING, ETC.
- 12. RELIANCE ON WALKING AIDS
- 13. INABILITY TO USE LOWER EXTREMITIES
- 14. EXTREMES OF SIZE AND WEIGHT

INCIDENTS OF INACCESSIBILITY

The technical literature does not provide a basis for developing categories of incidents of inaccessibility. Therefore, four categories are proposed and listed. The categories represent those instances when a particular characteristic of the physical environment results in 1) preventing a disabled person from using a building or one of its components, 2) causing an unsafe condition to a disabled user, 3) requiring an abnormal or highly augmented type of use, and 4) creating merely an inconvenience or annoyance.

1. USE IS PREVENTED
2. USE IS UNSAFE
3. USE IS RESTRICTED
4. USE IS CONVENIENT



APPENDIX B

Appendix B presents a general summary of the NBS database that was developed during 1981 by the Occupancy Safety Group of the Center for Building Technology. The database consists of information about problems that disabled people experience when they use buildings. The problems consist of perceived deficiencies of buildings and were collected by the Building Research Advisory Board (BRAB) from a variety of disabled individuals and organizations and individuals working with the disabled [Accessibility: An Approach ..., 1977].

Approximately 459 deficiencies are included in the BRAB report and are presented in a format that classifies them with respect to the building component of concern and the types of disabilities directly affected. The deficiencies are the basis for the records that constitute the NBS database. However, since a single deficiency can affect many different classes of disabled users, more than one record (database entry) can be developed for each deficiency.

The logical structure for the records is based on the assumption that problems (incidents of building inaccessibility) occur when physical characteristics of building systems require abilities that are not possessed by some segment of the user population (i.e., the disabled).

The format of the records is based on the causal relationship between physical characteristics of buildings and their effect on building users. Each record contains five fields as illustrated in figure B-1. The fields are arranged from left to right indicating a causal sequence initiated by characteristics of the environment transmitted through building components, their use, user's abilities, and resulting in incidents of inaccessibility.

Figure B-1. Accessibility database record

Characteristics of Building Components	Building Component Types	Building Uses	User Disabilities	Incidents of Inaccessibility
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Although deficiencies in the BRAB report covered many types of building components and building uses, the NBS database has been completed for only circulation components and uses. The current database file contains approximately 500 records.

Figures B-2 through B-6 are frequency histograms for the categories of the five fields in the records. The frequencies are counts of the number of times a particular category of a field occurred in the records. Consequently, the frequencies indicate the rate at which a particular category was reported in conjunction with an accessibility problem.

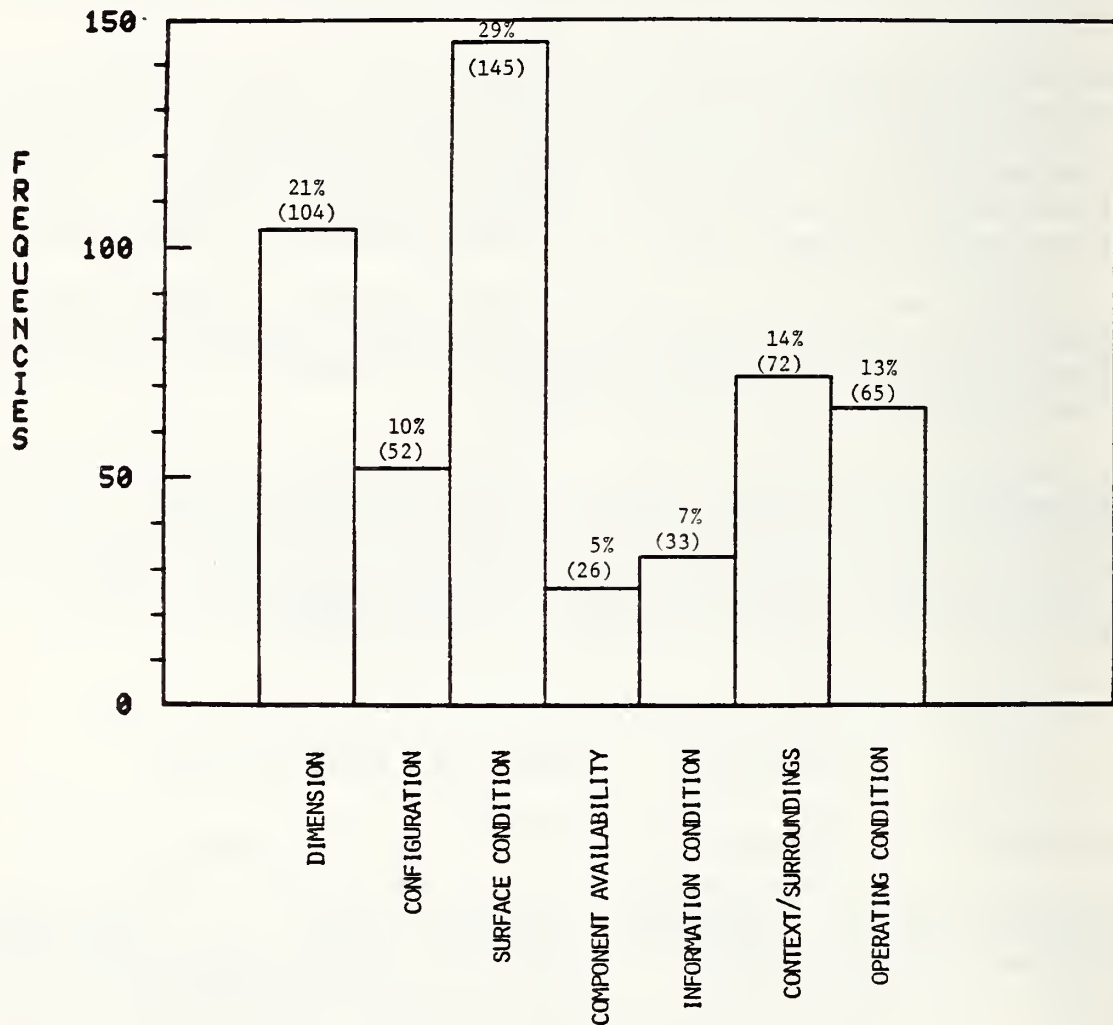


Figure B-2. Frequencies of occurrences of characteristics of building components

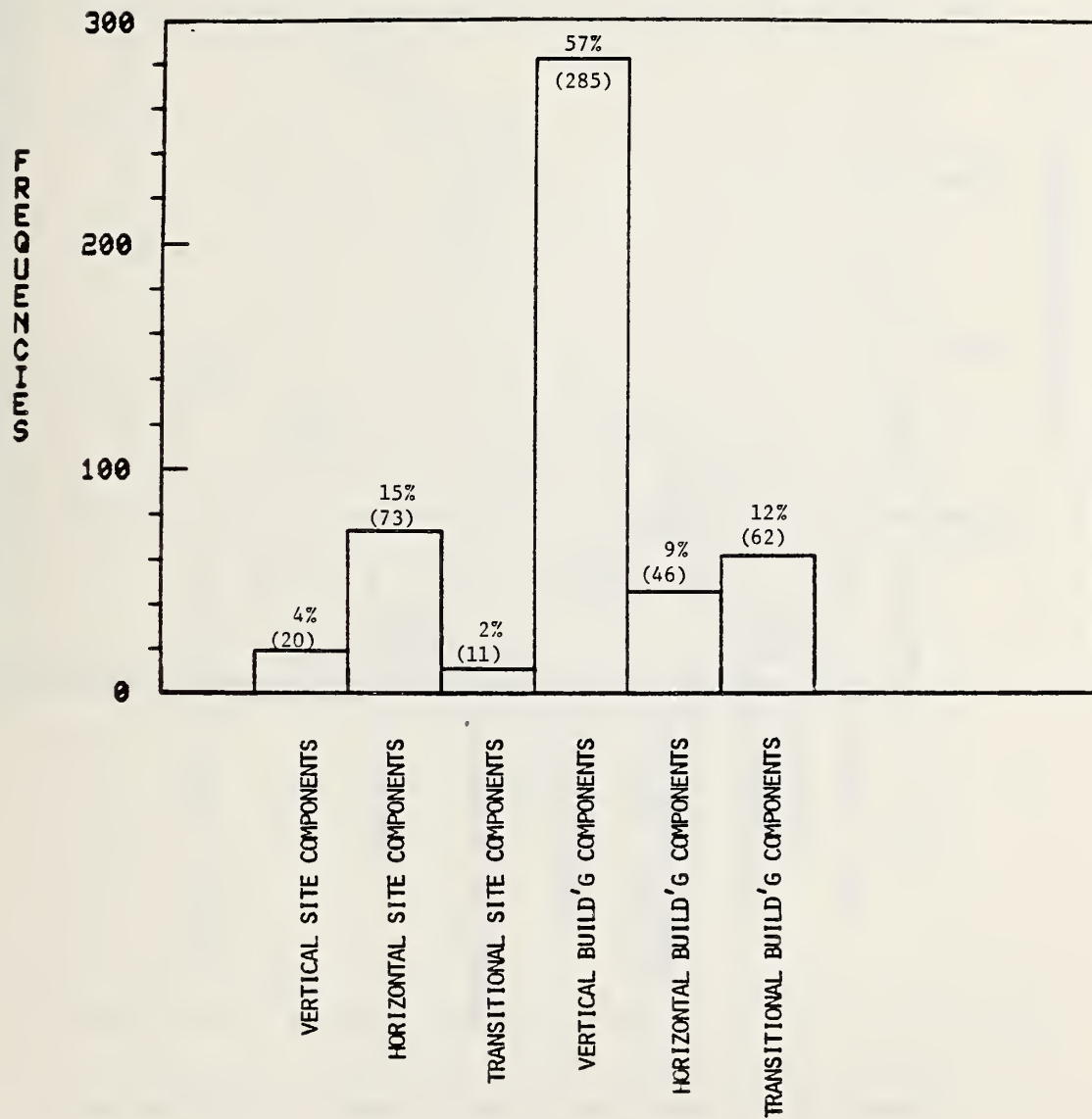


Figure B-3. Frequencies of occurrences of circulation component types

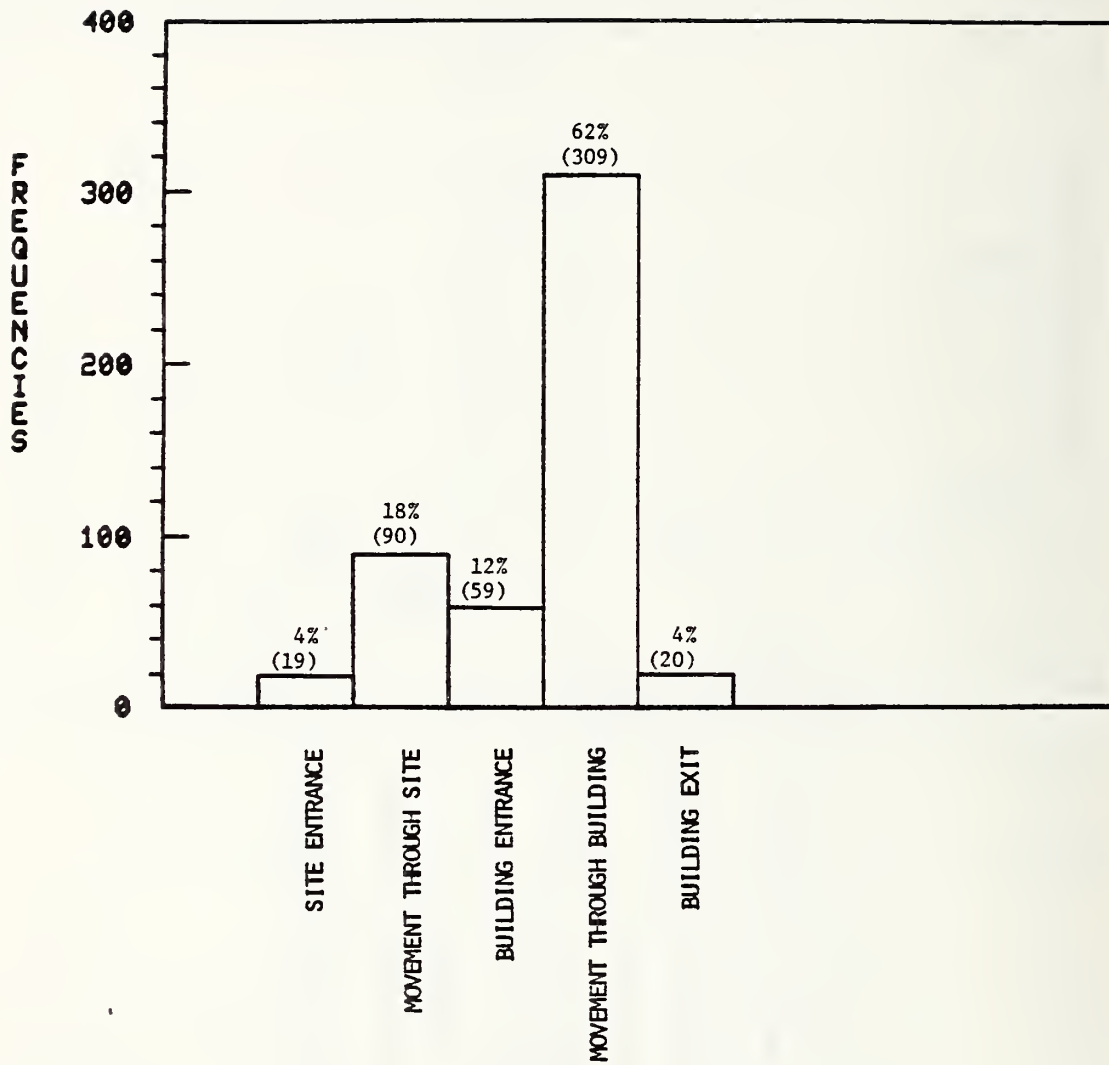


Figure B-4. Frequencies of occurrences of building uses

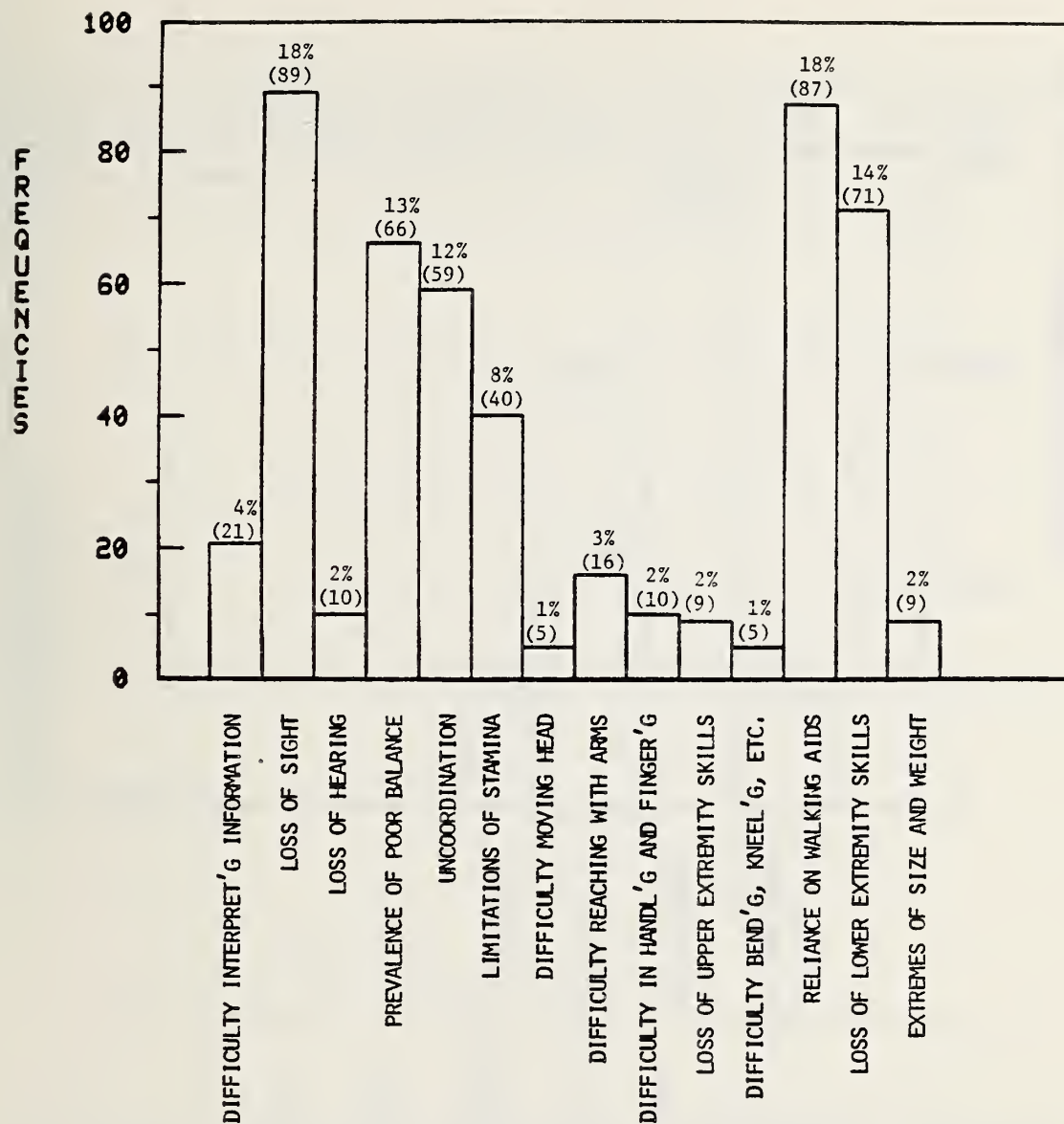


Figure B-5. Frequencies of occurrences of user disabilities

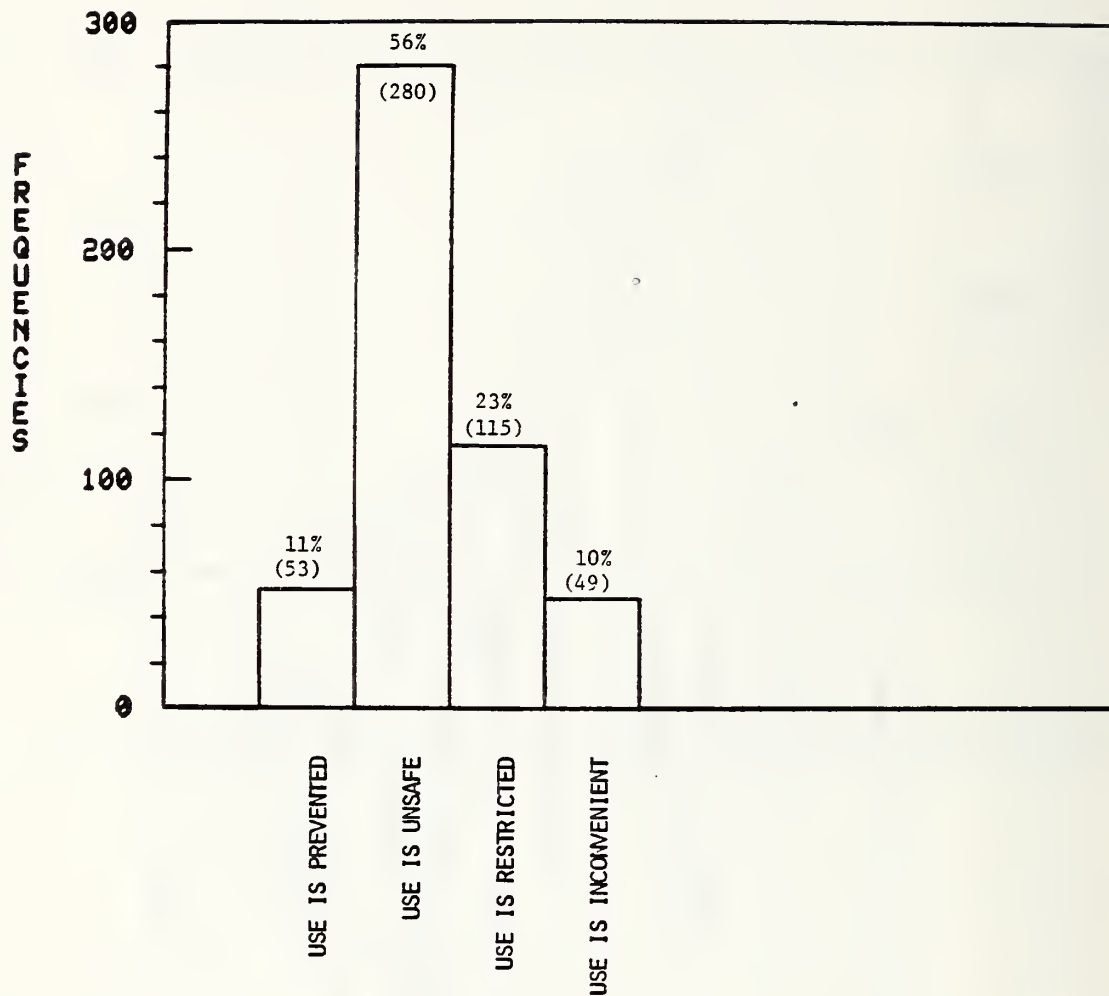


Figure B-6. Frequencies of occurrences of incidents of inaccessibility

It is possible to examine the frequencies of the categories of any one field with respect to a particular category of any other field. For example, figure B-7 illustrates the frequencies of occurrence of the categories of the circulation components in records where the user disability category is loss of sight.

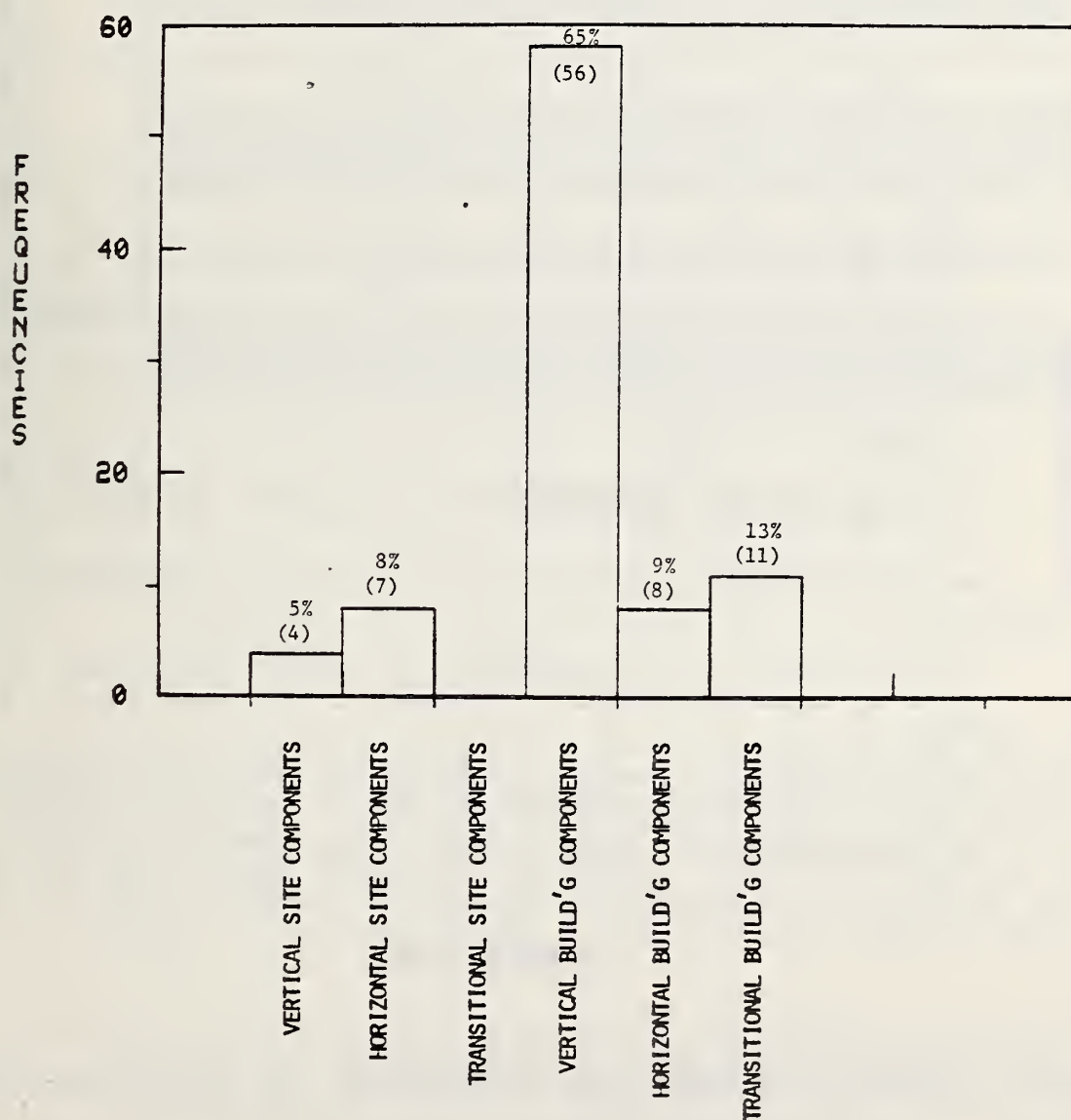


Figure B-7. Frequencies with which various building circulation components cause problems for individuals having a loss of sight

Figure B-8 illustrates occurrences of various building components that were identified in accessibility problems affecting disabilities. Where an "X" occurs at the intersection of a component and disability, there was a deficiency cited in the BRAB report. Therefore, it is possible to quickly see the disabilities that are affected by a wide range of components and the components that affect a wide range of disabilities.* In a similar fashion, figure B-9 depicts the range of characteristics relative to the various components where deficiencies have been identified.

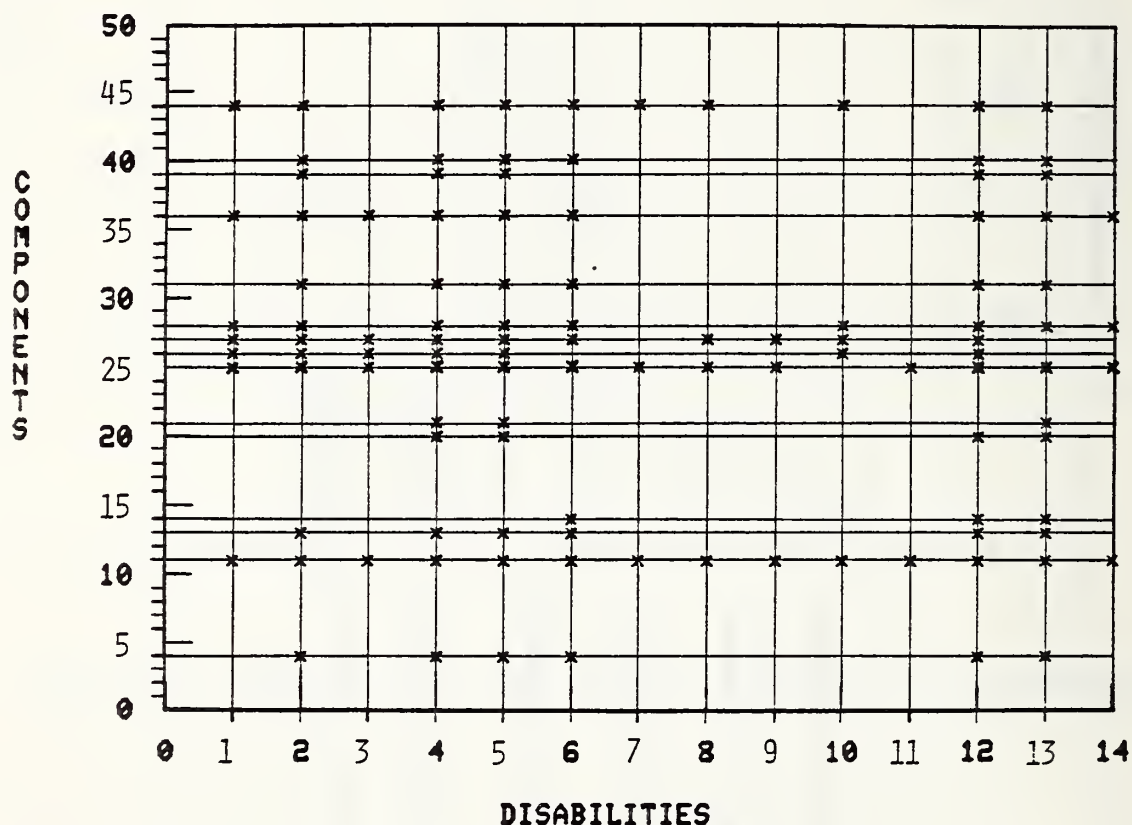


Figure B-8. Building components that cause problems for various disabilities

* The horizontal and vertical lines are included on the graph as an aid to reading the values on the frame lines.

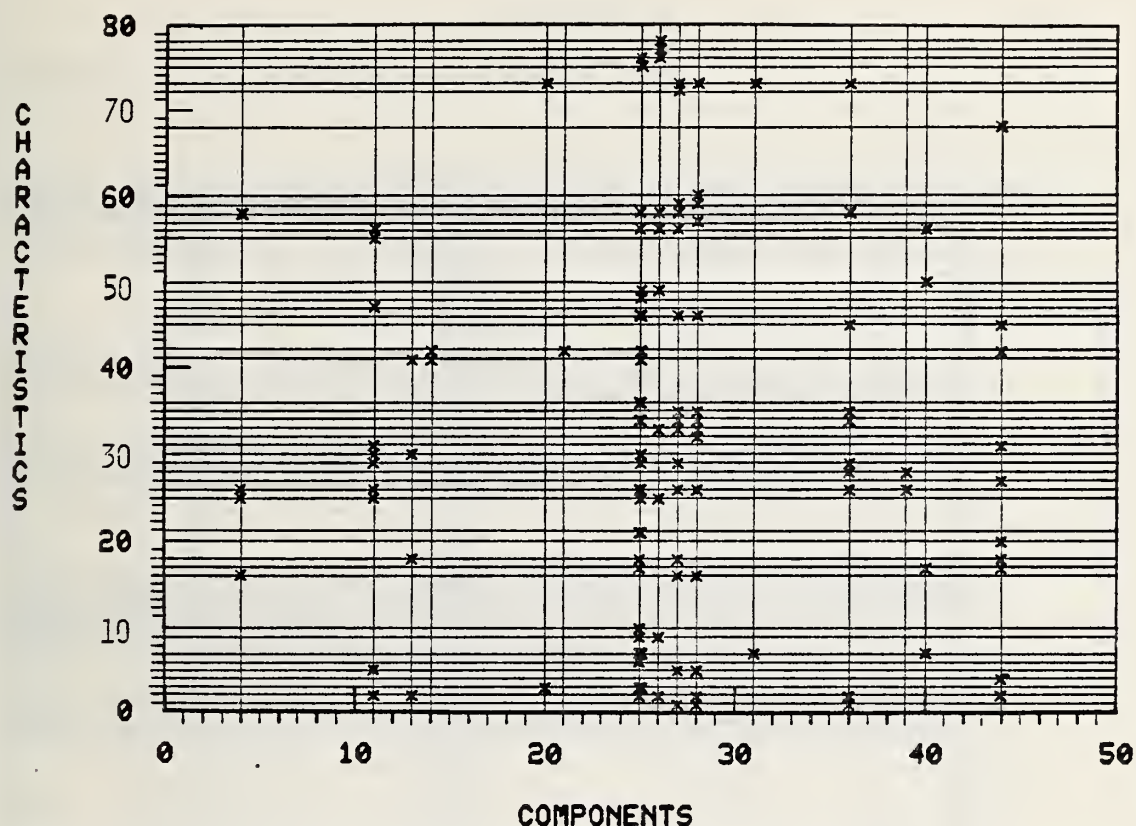


Figure B-9. Characteristics of building components that cause problems in accessibility

It is possible to analyze the database in greater detail than has been shown in figures B-8 and B-9. For example, components affecting disabilities can be examined with respect to any one or any set of characteristics; and characteristics of components that cause problems for a particular disability or a specific set of disabilities can be examined. Figure B-10 shows the range of characteristics relative to the various components that have been identified as a problem to individuals having a loss of sight. Similar figures could be developed for any other disability.

The figures above have illustrated a few of the various ways of querying the database. There are many other types of analyses that are possible. The information obtained from the database can be used to: 1) analyze the scope and completeness of existing and proposed accessibility guidelines or regulations, 2) make decisions about what type of environmental alterations are optimum for the range of disability types, and 3) to predict the kinds of accessibility problems that may be associated with proposed or existing building designs. In addition, the database information can help identify areas where research is needed through the comparison of accessibility problem areas with the existing knowledge base.

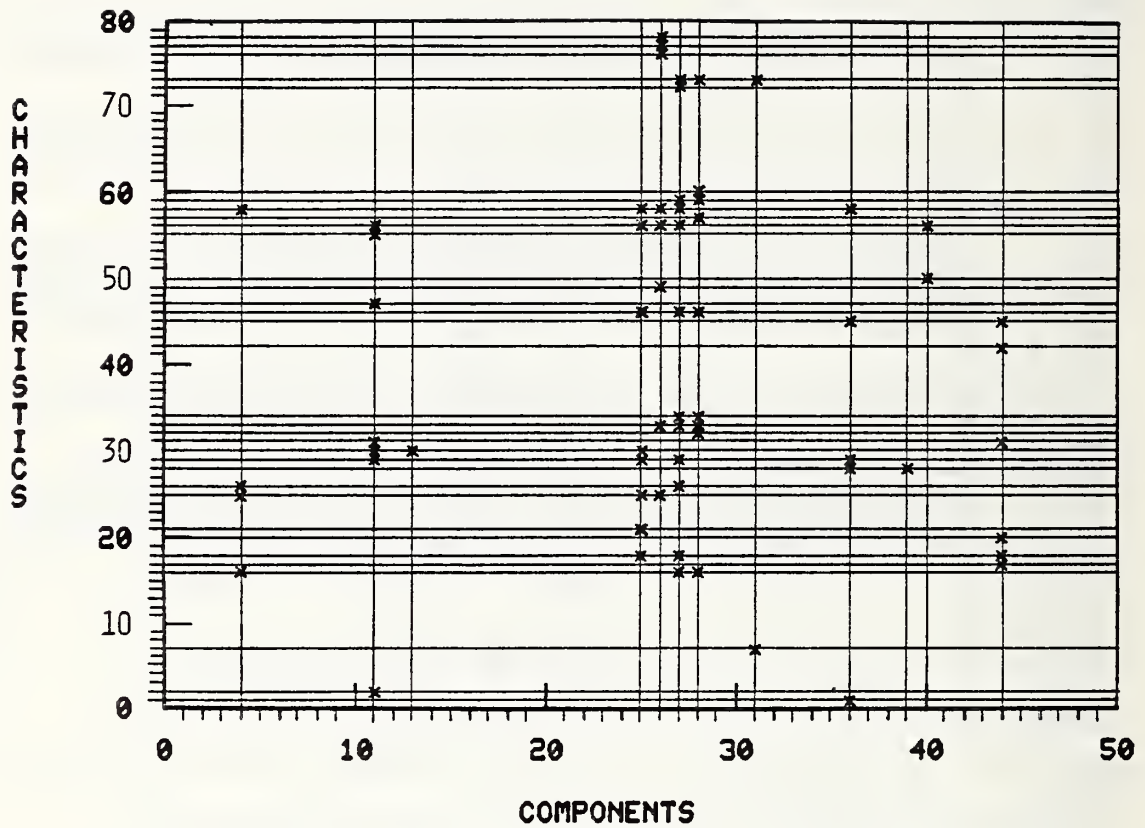


Figure B-10. Characteristics of building components that cause problems for individuals having a loss of sight

APPENDIX C

The following is a listing of the GSA data file:

1.	02.00		4.2.1
2.	02.00		4.2.2
3.	07.00		4.2.3
4.	07.00		4.2.4
5.	01.00		4.2.4.1
6.	02.00		4.2.4.1
7.	17.00		4.2.4.1
8.	16.00		4.2.4.2
9.	03.00		4.2.5
10.	03.00		4.2.6
11.	02.00		4.3.3
12.	02.00		4.3.4
13.	18.00		4.3.4
14.	05.00		4.3.7
15.	32.00		4.3.8
16.	58.00		4.4.1
17.	60.00		4.4.2
18.	32.00		4.5.2
19.	34.00		4.5.3
20.	36.00		4.5.3
21.	35.00		4.5.4
22.	41.00	13.00	4.6.1
23.	42.00	13.00	4.6.1
24.	18.00	13.00	4.6.2
25.	02.00	13.00	4.6.3
26.	50.00	13.00	4.6.4
27.	01.00	14.00	4.6.5
28.	02.00	14.00	4.6.5
29.	17.00	14.00	4.6.5
30.	18.00	04.00	4.7.1
31.	05.00	04.00	4.7.2
32.	02.00	04.00	4.7.3
33.	16.00	04.00	4.7.5
34.	17.00	04.00	4.7.6
35.	58.00	04.00	4.7.8
36.	17.00	04.00	4.7.9
37.	02.00	04.00	4.7.10
38.	16.00	04.00	4.7.10
39.	17.00	04.00	4.7.10
40.	05.00	05.00	4.8.1
41.	05.00	28.00	4.8.1
42.	05.00	05.00	4.8.2
43.	05.00	28.00	4.8.2
44.	02.00	05.00	4.8.3
45.	02.00	28.00	4.8.3
46.	02.00	31.00	4.8.4(1)
47.	01.00	31.00	4.8.4(2)
48.	01.00	31.00	4.8.4(3)
49.	02.00	31.00	4.8.4(3)
50.	70.00	05.00	4.8.5
51.	73.00	05.00	4.8.5
52.	70.00	28.00	4.8.5
53.	73.00	28.00	4.8.5
54.	70.00	05.00	4.8.5(1)
55.	73.00	05.00	4.8.5(1)
56.	70.00	28.00	4.8.5(1)

57.	73.00	28.00	4.8.5(1)
58.	73.00	05.00	4.8.5(2)
59.	73.00	28.00	4.8.5(2)
60.	73.00	05.00	4.8.5(3)
61.	73.00	28.00	4.8.5(3)
62.	73.00	05.00	4.8.5(4)
63.	73.00	28.00	4.8.5(4)
64.	73.00	05.00	4.8.5(5)
65.	73.00	28.00	4.8.5(5)
66.	73.00	05.00	4.8.5(6)
67.	73.00	28.00	4.8.5(6)
68.	72.00	05.00	4.8.7
69.	72.00	28.00	4.8.7
70.	59.00	05.00	4.8.8
71.	59.00	28.00	4.8.8
72.	59.00	03.00	4.9.6
73.	59.00	27.00	4.9.6
74.	25.00	25.13	4.10.2
75.	03.00	25.02	4.10.3
76.	45.00	25.02	4.10.3
77.	17.00	25.02	4.10.3
78.	45.00	25.04	4.10.4
79.	49.00	25.04	4.10.4
80.	03.00	25.04	4.10.4(1)
81.	17.00	25.04	4.10.4(3)
82.	49.00	25.04	4.10.4(3)
83.	76.00	25.05	4.10.6
84.	03.00	25.14	4.10.6
85.	06.00	25.14	4.10.6
86.	06.00	25.05	4.10.7
87.	06.00	25.05	4.10.8
88.	01.00	25.09	4.10.9
89.	02.00	25.09	4.10.9
90.	56.00	25.06	4.10.11
91.	56.00	25.09	4.10.11
92.	56.00	25.13	4.10.11
93.	02.00	25.02	4.10.12(1)
94.	17.00	25.02	4.10.12(1)
95.	48.00	25.02	4.10.12(2)
96.	03.00	25.02	4.10.12(3)
97.	17.00	25.02	4.10.12(4)
98.	46.00	25.08	4.10.13
99.	17.00	25.08	4.10.13
100.	03.00	25.07	4.10.14
101.	46.00	25.07	4.10.14
102.	18.00	19.00	4.13.2
103.	18.00	46.00	4.13.2
104.	02.00	44.00	4.13.5
105.	07.00	40.00	4.13.6
106.	17.00	44.00	4.13.7
107.	31.00	40.00	4.13.8
108.	75.00	44.00	4.13.9
109.	06.00	44.00	4.13.10
110.	10.00	44.00	4.13.11(1)
111.	10.00	44.00	4.13.11(2)
112.	06.00	44.00	4.13.12
113.	10.00	44.00	4.13.12
114.	41.00	44.00	4.14.1
115.	42.00	44.00	4.14.1
116.	18.00	44.00	4.14.1
117.	57.00	40.00	4.14.2

APPENDIX D

Appendix D presents a general structure and listing of elements for specifying accessibility. Figure D-1 illustrates the structure of the relationships among elements. The parameters of component characteristics are dependent upon specific components, their uses, and/or users.

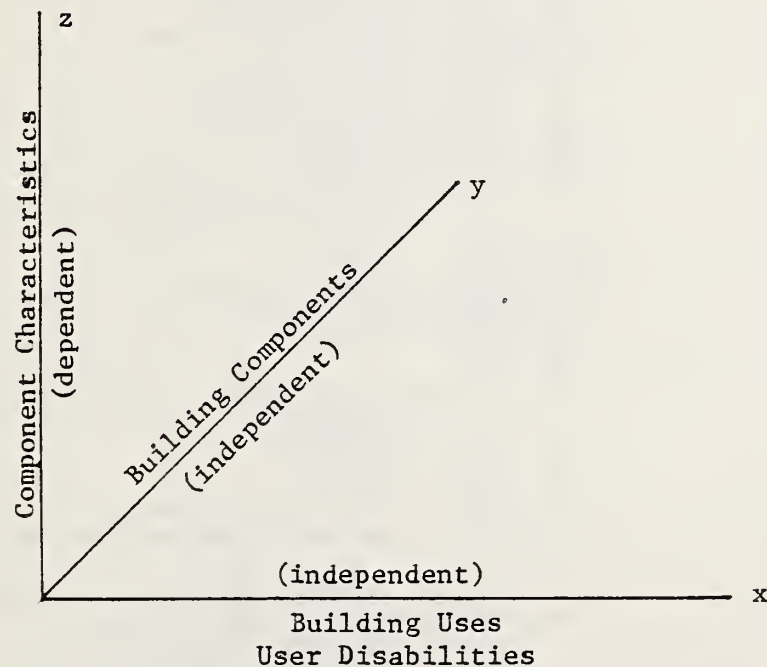


Figure D-1. Relationship of Accessibility Elements

When specific building components, uses, and/or users are specified, particular quantities and/or qualities of the component characteristics are necessary for successful use of the specified components. When parameters of the characteristics are inappropriate, resulting incidents of inaccessibility can be expected. Figures D-2 through D-5 provide classes of the elements used in the relationships shown in figure D-1.

PHYSICAL CHARACTERISTICS OF BUILDING COMPONENTS	Dimension	1. Length 2. Width 3. Height 4. Weight 5. Slope 6. Operating Time 7. Area 8. Volume 9. Rate of Movement 10. Resistance to Operation
	Configuration	16. Shape 17. Relative Position 18. Location 19. Pattern 20. Direction of Swing 21. Non-uniform Placement
	Surface Condition	25. Uneven 26. Slippery 27. Rough 28. Texture Change 29. Glare Producing 30. Holes or Depressions 31. Protrusions 32. Abrupt Level Change 33. No Edge Marking 34. Loose Surface 35. Grating 36. Carpeting Pile Height
	Component Availability	41. Insufficient Number 42. Not Available
	Information Condition	45. Insufficient 46. Imperceptible 47. None 48. Confusing 49. Inappropriately Located 50. Handicap Access Identification Missing
	Context/ Surroundings	55. Inappropriate Foliage and Landscaping 56. Poor or No Illumination 57. Indirect or Undesirable Route 58. Objects that Protrude or Obstruct 59. Exposure to Weather 60. Low Ceiling
	Operating Condition	66. Human Assistance Insufficient 67. Human Assistance not Available 68. Mechanical Assistance Element Missing 69. Mechanical Assistance Insufficient 70. Manual Assistance Element Missing 71. Element not Operating 72. Element has Missing Part 73. Manual Assistance Element Insufficient 74. Element is Missing 75. Complex Manipulation Required 76. Operation Non-reversible 77. Intermeshes With of Closes Against Something 78. No Emergency Stop

Figure D-2. Physical Characteristics of Building Components

BUILDING CIRCULATION COMPONENTS	Vertical Site Components	1. Elevators 2. Escalators 3. Stairs 4. Curb Cuts 5. Ramps 6. Vertical People Movers
	Horizontal Site Components	10. Horizontal People Movers 11. Walkways 12. Plazas 13. Parking Spaces 14. Pedestrian Drop-off and Pick-up Points
	Transitional Site Components	18. Gates 19. Turnstiles 20. Curb Curbs 21. Railings 22. Fences
	Vertical Building Components	25. Elevators Waiting Area Call Buttons Car Location Indicator and Directory Directional Indicator Elevator Doors Car Operating Panel Emergency Phone In-car Location Indicator Car Platform/Floor Car Walls Car Ceiling Handrails Platform/Waiting Area Sills Door Opening Detectors Emergency Exitway
		26. Escalators Up Comb Plate Steps Down Comb Plate Handrail
		27. Stairs 28. Ramps 29. Vertical People Movers 30. Stair Landings 31. Ramp Landings
	Horizontal Building Components	35. Horizontal People Movers 36. Corridors 37. Aisles 38. Walkways 39. Lobbies 40. Entry-way/Entrance Area
	Transitional Building Components	44. Doors 45. Gates 46. Turnstiles 47. Railings

Figure D-3. Building Circulation Components

BUILDING	<ol style="list-style-type: none"> 1. Movement Between Building Site Locations 2. Movement In and Out of Buildings 3. Movement Between Locations Within Buildings 4. Motions and Manipulations Associated with Locations in Buildings 5. Motions and Manipulations Associated with Building Equipment
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Figure D-4. Building Uses

USER DISABILITIES	<ol style="list-style-type: none"> 1. Difficulty Interpreting Information 2. Loss of Sight 3. Loss of Hearing 4. Prevalence of Poor Balance 5. Uncoordination 6. Limitations of Stamina 7. Difficulty Moving Head 8. Difficulty Reaching with Arms 9. Difficulty in Handling and Fingering 10. Loss of Upper Extremity Skills 11. Difficulty Bending, Kneeling, etc. 12. Reliance on Walking Aids 13. Inability to Use Lower Extremities 14. Extremes of Size and Weight
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Figure D-5. User Disabilities

General use of the structure of accessibility elements is as follows:

1. Specify the component(s), use(s), and/or user(s) of interest.
2. Search the database for the subset of component(s) associated with the specified use(s) and/or user(s).
3. The characteristics associated with the component subset(s) resulting from the search are the characteristics that have been identified as causing accessibility problems.
4. Specify parameters for the component characteristics that will result in accessibility.
5. If step 4 cannot be achieved using the available knowledge, an area for further investigation or research has been identified.

U.S. DEPT. OF COMM. BIBLIOGRAPHIC DATA SHEET <i>(See instructions)</i>	1. PUBLICATION OR REPORT NO. NBSIR 82-2567	2. Performing Organ. Report No.	3. Publication Date August 1982
4. TITLE AND SUBTITLE An Analysis of Section 2.4 Through 4.14 of the GSA Proposed Uniform Federal Accessibility Standard			
5. AUTHOR(S) George Turner			
6. PERFORMING ORGANIZATION <i>(If joint or other than NBS, see instructions)</i> NATIONAL BUREAU OF STANDARDS DEPARTMENT OF COMMERCE WASHINGTON, D.C. 20234		7. Contract/Grant No.	8. Type of Report & Period Covered
9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS <i>(Street, City, State, ZIP)</i> Design Management Division General Services Administration Washington, DC 20405			
10. SUPPLEMENTARY NOTES <input type="checkbox"/> Document describes a computer program; SF-185, FIPS Software Summary, is attached.			
11. ABSTRACT <i>(A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here)</i> <p>Recently, the General Services Administration (GSA) developed a draft uniform accessibility standard (the focus of this report) intended to be promulgated in conjunction with the Department of Housing and Urban Development, the Department of Defense, and the United States Postal Service. Under contract to the General Services Administration, the National Bureau of Standards (NBS), Center for Building Technology assisted in the review of part 4, sections 4.2 through and including 4.14 of the draft standard in order to determine the extent to which previously identified problems of accessibility (NBS database) were addressed by the provisions of the standard. The analysis was carried out by reviewing and classifying the provisions of the draft standard; searching the NBS data base for information relevant to the classes of provisions in the draft standard; and comparing the provisions with the NBS database.</p>			
12. KEY WORDS <i>(Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons)</i> Accessibility; barrier-free design; building accessibility; database analysis			
13. AVAILABILITY <input checked="" type="checkbox"/> Unlimited <input type="checkbox"/> For Official Distribution. Do Not Release to NTIS <input type="checkbox"/> Order From Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. <input checked="" type="checkbox"/> Order From National Technical Information Service (NTIS), Springfield, VA. 22161			14. NO. OF PRINTED PAGES 58 15. Price \$9.00

